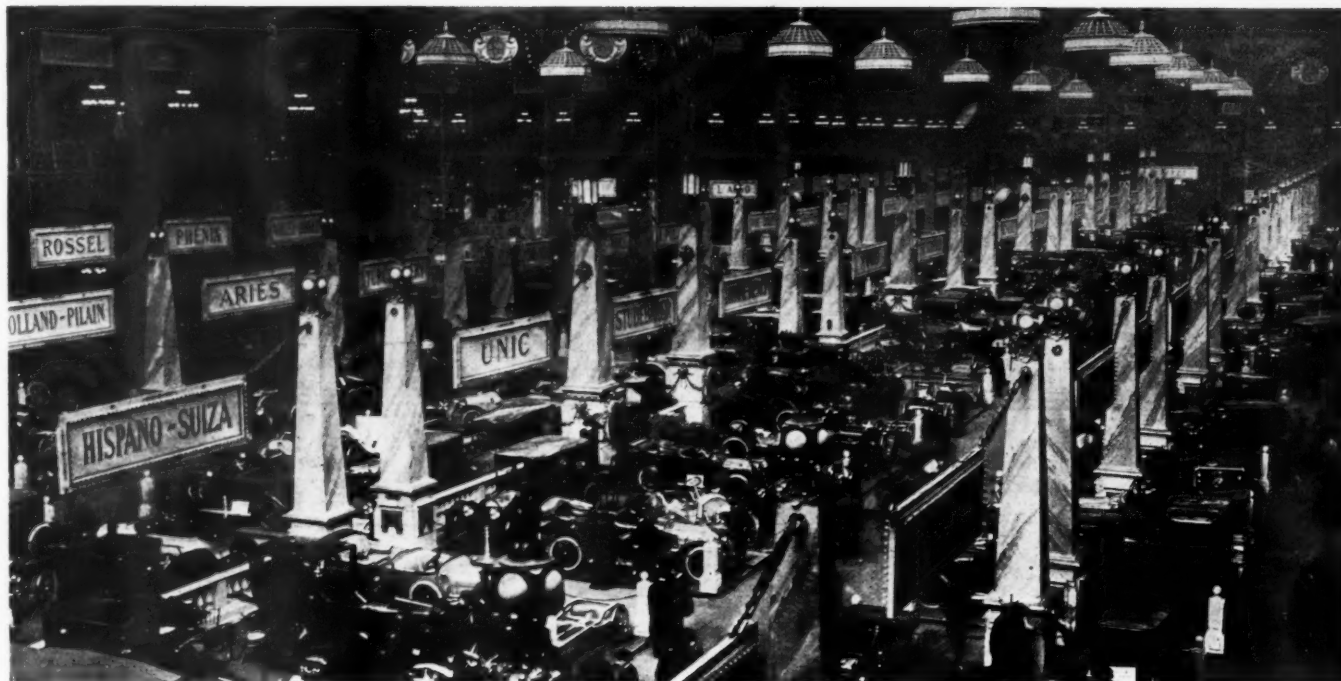




The AUTOMOBILE



A uniform system of decoration is used in the Paris show, these decorations being furnished with the space

Smaller Motors at Paris Salon

Block Casting Leads—Accessible Parts Featured—Helical Axle Drive Shown—Brakes Are Larger—Few Sixes Exhibited—General Tendencies

By W. F. Bradley

PARIS, FRANCE, Oct. 22 —European motors as shown at the Paris Salon, indicate a further decrease in size. In this issue the bore and stroke of practically all motors is given, in comparison with the dimensions of a year ago. This should not be interpreted too literally, however, for it frequently happens that big models figure on the makers' catalogues but are made only in infinitely small numbers. With a full knowledge of all circumstances, we should fix the average European motor size at 3.1 by 5.5 inches bore and stroke. The number of cars fitted with motors of 4 inches bore is small, and the number with a cylinder bore exceeding 4 inches is very small. With a cylinder area of 3-liters, 183

Paris Show Analyzed

Car makers.....	133	Clothing.....	11
Chassis and parts.....	49	Forgings.....	23
Commercial vehicles.....	32	Welding.....	4
Tires and wheels.....	125	Machine tools.....	13
Bodies.....	127	Motorcycles.....	4
Lighting outfits.....	67	Bicycles.....	62
Car accessories.....	68	Bicycle parts.....	31
Oils and greases.....	8	Newspapers.....	22

NON-POPPET MOTORS AT PARIS

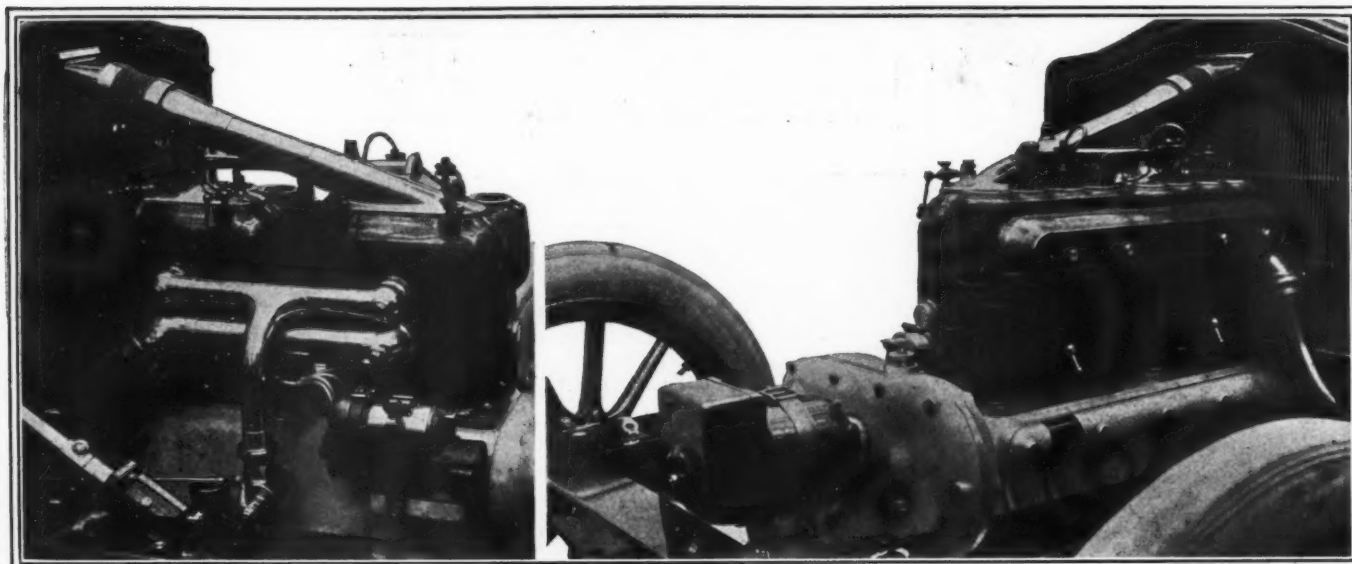
	1913	1914
Aries.....	Knight	Knight
Bellenger.....	Knight	Knight
C. I. D.....	Rotary ring	Rotary ring
C. L. C.....	Single sleeve	Withdrawn
Buchet.....	Reciprocating ring	Withdrawn
Clement-Bayard.....	Knight	Knight
Darracq.....	Rotary	Withdrawn
Delaugere-Clayette.....	Sleeve	Sleeve
Itala.....	Rotary ring	Rotary ring
Minerva.....	Knight	Knight
Mercedes.....	Knight	Knight
Mors.....	Knight	Knight
Panhard.....	Knight	Knight
Rolland-Pilain.....	Sleeve	Withdrawn
Piccard-Pictet.....	Argyll sleeve	Argyll sleeve
Schnelder Th.....	Sleeve	Withdrawn

SYSTEMS OF REAR AXLE DRIVE

Worm only—Daimler, Bellenger.....	2
Worm and bevel models—Darracq, Gregoire, Peugeot, Minerva, De Dion.....	5
Double helical only—Mors.....	1
Double helical and chain—Gobron.....	1
Double helical, worm and bevel—Minerva.....	1
Bevel only—All other makers.....	124

cubic inches, it is considered possible to get all the power that can be required for touring purposes or for town work with heavy bodies. The effect of racing can be seen strongly here.

There has been this year a very strong movement towards small motors on light cars which must generally be considered of the runabout type. These are really a link between the rudimentary cyclecar and the touring car. The cyclecar is really responsible for their birth. The public has seen what it is possible to do with really small motors on a very simple type of chassis and has asked for something built on car lines and having all the appearance of a car, but possessing the low cost of upkeep of a cyclecar.

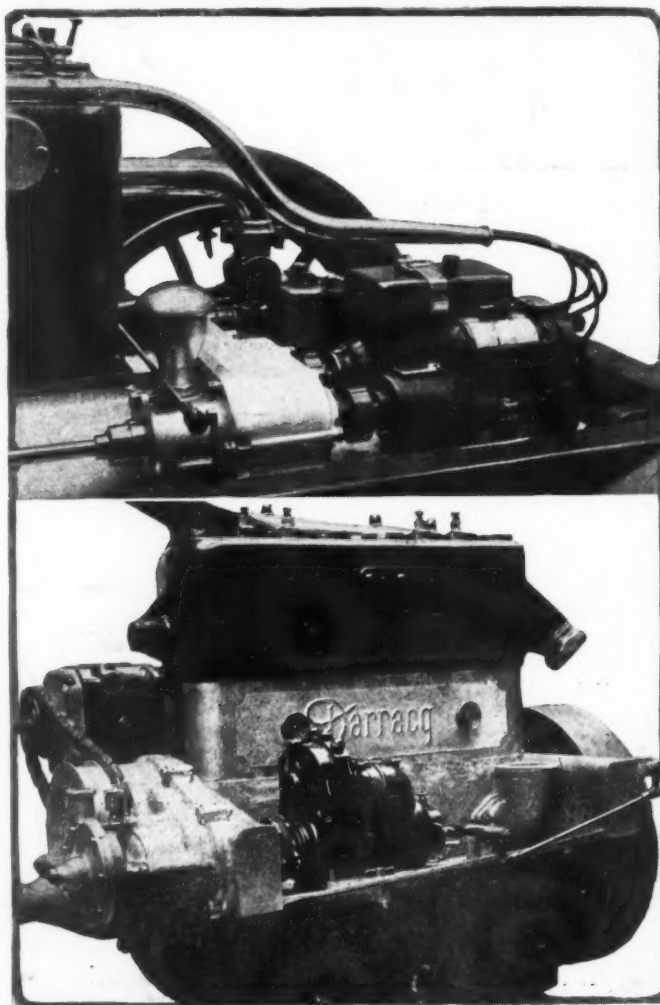


New Renault four-cylinder motor, with magneto mounted at the side instead of in front. At the right is the exhaust side, showing charging generator mounted in front of timing gear case. Note accessible valve cover plates, new exhaust manifold and chain-driven timing gears; also characteristic large Renault radiator mounted in front of dash and large water intake connection

This is a really substantial movement. It has been entered into by such firms as Charron, Chenard-Walcker, Buchet, F. N., Majola, Barre, and Gregoire, the cylinder dimensions varying from 2.3 by 4.3 to 2.4 by 5.1 inches bore and stroke.

L-Type in King Row

The L-type block cylinder casting is in a very big majority. It is followed by the T-type. Tendency is more and more towards block casting with an integral intake manifold, the carbureter being on the right bolted direct to the group, and a separate exhaust manifold. This applies to motors as high as 4.5 inches bore. The integral exhaust manifold is found in a number of cases, but although it gives a very neat-looking motor, most designers are of the opinion that they can make better use of their cooling water than carrying it round the exhaust pipe. Hotchkiss, Renault, Charron, Unic, may be mentioned as four leading firms adopting this general method of integral intake and separate exhaust manifold. With a view to neat motor appearance, Charron has adopted the plan of placing the intake water pipe directly behind the cylinder casting, instead of along one side, as is usual. This, of course, is with a motor having the radiator back of the motor. In this position the pipe is practically invisible. The plan



Bayard-Clement motor, with magneto, generator and carbureter mounted in front of timing gear housing. Note long, curved bus bar which protects wiring, and also large oil filler for crankcase mounted at front end of cylinders

New block type Darracq motor with charging generator. Note location of magneto, leaving valve springs accessible upon removal of single-piece cover plate shown in the illustration. Note silent chain drive of charging generator. Fan is not shown

is adopted on one of the very small models as well as on a long-stroke type of 3.3 by 5.9 inches.

Valve-in-the-Head Type Gains

The only example of a detachable head appears to be on the Ajax cyclecar produced in France by Benjamin Briscoe. In the movement towards higher efficiency, a certain number of makers have changed from the L to other types. Thus Gregoire has produced a T-type, Hispano-Suiza has changed from T to valve-in-the-head type; Martini has made a motor with valves in the head. This movement has not been followed very generally, but there are possibilities of development here.

Non-Poppets on the Toboggan

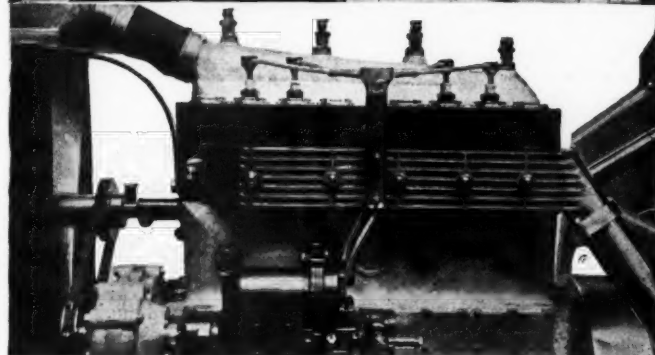
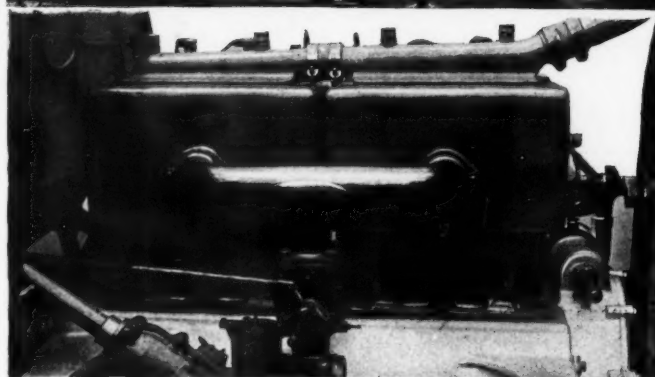
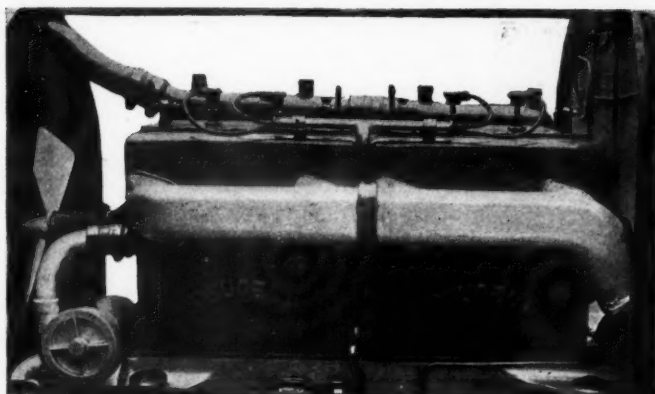
The non-poppet valve motor is at a standstill. Accompanying this article is a table showing the non-poppet valve motors built last year and produced this year. The Knight motor is gaining, but the scores of others which came out with the craze for extreme silence have in very many cases been pushed into the background. Darracq has entirely abandoned its rotary valve motor in favor of the poppet type; the C. L. C. single-sleeve is not on exhibition; the Dubois-Rousseau reciprocating-ring type, shown by Buchet last year, has not made a reappearance; the Th. Schneider sleeve type shown a

year ago and used for racing purposes has not been produced commercially. C. I. D. has been successful, a bigger model being added to the one produced 2 years ago. Unic experimented for a long time with non-poppet valve but has decided not to put it on the market. Briefly, there is not a single non-poppet announcement of any importance this year. Making an exception of the Knight, it may be stated that the poppet is supreme in this year's show.

Renault Uses Silent Chain

Silent chain drive for camshaft, magneto shaft, water pump, etc., is on the increase. There does not appear to be a single case of a manufacturer having used chains and returned to pinions. One of the most notable converts to chain drive is Renault, who is this year fitting it on his new 18 horsepower model. In this case there are three chains: from crankshaft to camshaft, from crankshaft to magneto shaft, and from magneto shaft to dynamo shaft. Distances between centers are 5.1 and 5.9 inches, this latter for the dynamo.

Chapuis & Dornier, motor specialists for the trade, have revised their whole series of motors to take chain drive. This firm formerly used pinions with a spring mounting on the camshaft. Ballot, another maker of motors for the trade, has adopted chains in place of meshing gears. On the small



New 40-horsepower Peugeot with magneto low and manifold high
Intake side, 40-horsepower Peugeot with transverse shaft for driving water pump and generator
Valve side of new Sizaire-Berwick motor with chain timing gears

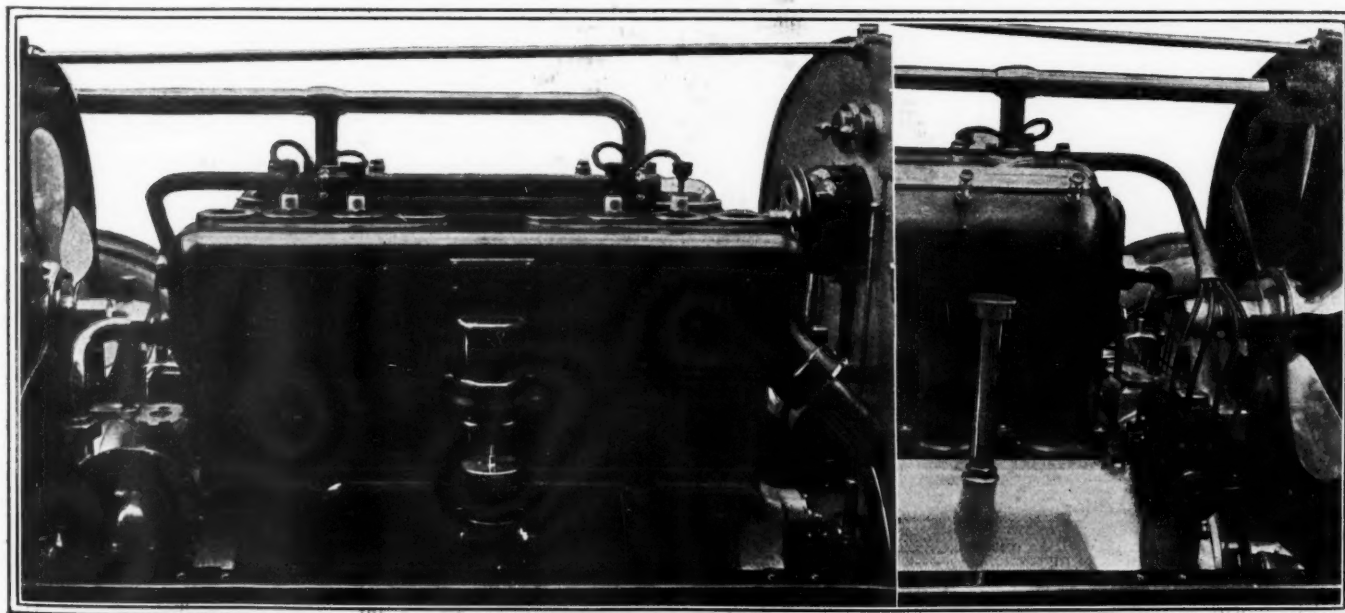
Charron car use is made of a single chain on two pinions only by placing the magneto on the end of the crankshaft and cranking on the camshaft. On the larger cars built by this firm, the single chain is on three pinions with an eccentric for the magneto shaft. With a dynamo fitted, a special timing gear cover is employed, this having a supplementary shaft and pinion obtaining its drive by chain from the magneto shaft.

Two Chains Preferred to One

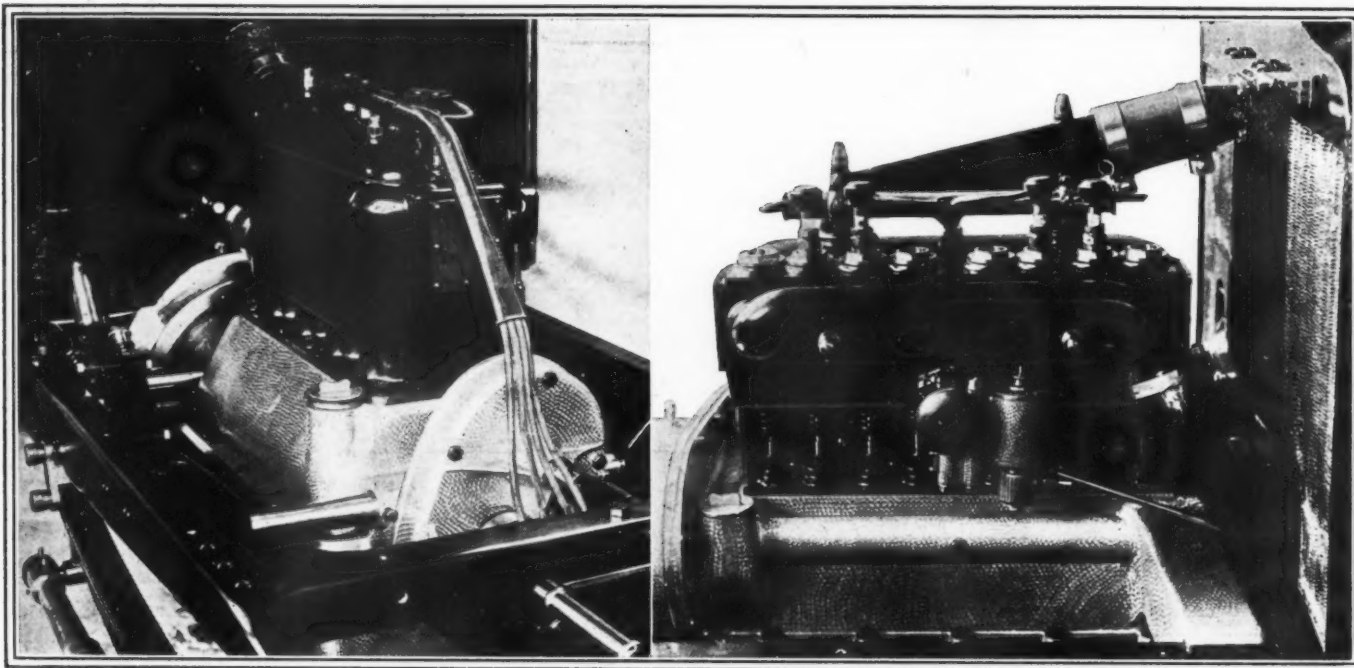
There appears to be a tendency towards the use of a couple of short chains without adjustment, rather than a single chain driving three shafts with adjustment. The Darracq is an example of this, a broad chain uniting crankshaft and camshaft, and a narrower chain running from camshaft to magneto shaft on the left hand side of motor. These chains are made by the Coventry company, are non-adjustable, and the distance between centers is 5.1 inches.

On the eight-cylinder De Dion Bouton motors the chain arrangement is from crankshaft to camshaft in the same vertical plane, and from camshaft to magneto and ventilator shaft.

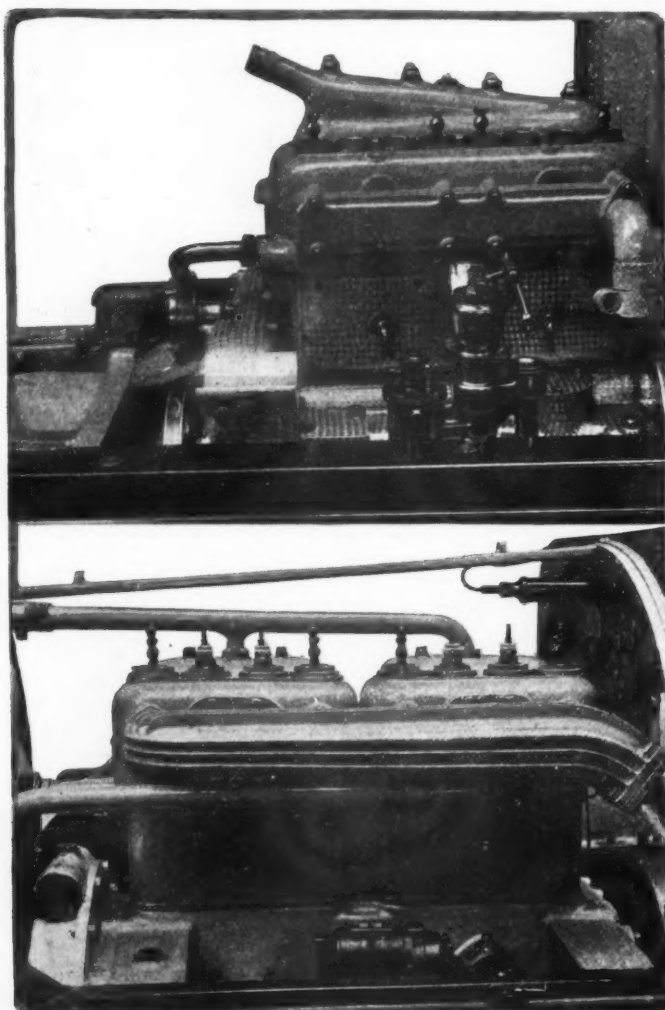
So compactly are many of the silent chain drives arranged that it is difficult to distinguish between them and gears. The transverse shaft for magneto, pump and generator drive is a rival.



Intake side of new 40-horsepower Berliet four-cylinder block type with transverse shaft driving pump and magneto.



Charron 8-horsepower, 60 by 110, with magneto driven from crankshaft and starting handle on camshaft. Motor is carried on cross tubes. At right side, 12-horsepower Charron with horizontal type Zenith carburetor



Unic 80 by 130 motor. Note accessible valve arrangements, also air-cooled detachable exhaust manifold

Hotchkiss 110 by 150 with water pipe and exhaust manifold mounted high and magneto mounted low, leaving valve covers and parts accessible. Note air-cooled manifold

Among the conspicuous firms adhering to meshing pinions are Hispano-Suiza, with a spring mounting of camshaft pinions; Hotchkiss, also with a spring mounting on camshaft, Sizaire-Berwick with compressed fiber for camshaft, and Delaunay Belleville with spur pinions.

Tubular Connecting Rods Gain

Reciprocating parts are generally lighter than a year ago. The I-section connecting-rod is in a very big majority, although the tubular rod has been adopted by several firms during this season. Instances are Sizaire-Berwick, Delaunay-Belleville, Sautter-Harle.

Steel pistons, although not in a majority, are fairly commonly employed. They are used by Sizaire-Berwick, Chenard & Walcker, Gregoire, Abadal, Anasagasti. Magnalium and other light metal pistons are not generally been used. Gregoire has turned out a few cars with magnalium pistons. Violet-Bogey makes all his cyclecar pistons of this metal. There is a tendency to make wristpins hollow and of much greater diameter than formerly. The Sizaire-Berwick and Chenard-Walcker cars are particularly good examples of this.

Three Piston Rings General

It may be taken that three piston rings are used on 75 per cent. of the French motors. The other 25 per cent. comprise two double spiral rings and small motors having two ordinary rings. Some makers fit two rings on their small motors—70 millimeters and less diameter—and three rings on the larger models. Scraper rings on the base of the piston are now very little used; the same effect can be obtained by making the skirt thin. Oil grooves on the pistons are less seen than was the case a year ago.

Ball-Bearing Crankshafts on Wane

Ball-bearing crankshafts have gone back rather than increased in favor. Although they have been very successful on racing cars, particularly on the Delage and Peugeot racers of the last two seasons, makers hesitate to put them into motors intended for the ordinary customer. Delage last year used a central ball bearing and two plain bearings for his six-cylinder motor, but is now employing three plain bearings. Gobron uses a central ball bearing and two plain bearings for a four-cylinder crankshaft. Aquila has the same arrangement for a six. There are a few very small motors with two ball bearing crankshafts. On the whole the two-bearing crankshaft, plain bearings, has

lost place. It is found on the new Unic of 80 by 130 millimeters and on the Briscoe of equal dimensions, the diameter of the shaft in each case being practically 2 inches. The vast majority of makers prefer a three-bearing shaft. There appears to be nothing to indicate that this will be displaced in the near future by the five-bearing crankshaft for four-cylinder motors. Renault, however, who has been a strong advocate of the three-bearing crankshaft has this year produced a 3.7 by 6.29 motor cast in pairs with a five-bearing crankshaft.

Four-Bearing Shaft an Attraction

It appears quite likely that the rival to the three-bearing shaft will be the four-bearing shaft, rather than five bearings. There are only two examples this year: Motobloc, which is, of course, special by reason of its central flywheel, and Hispano-Suiza with two long end bearings and a couple of shorter bearings between the first and second and the third and fourth cylinders. Engineers have given this matter attention and in several cases would have produced four-bearing shafts this year if manufacturing arrangements had made it possible. Four bearings appear to embody a greater number of advantages than five, for the former can be used with a short block casting having a shaft of extreme rigidity. For the medium size motors of 3.1 inches bore crankshaft diameters vary from 1.88 to 2.16 inches.

Ball-Bearings for Camshafts

Camshafts are almost invariably carried in ball bearings. The only new departure appears to be the use of cast iron bearings for the camshaft. This has been done by Darracq and by Hispano-Suiza. Both firms have tested these bearings for long periods with satisfactory results. Lower cost is the main reason for their adoption.

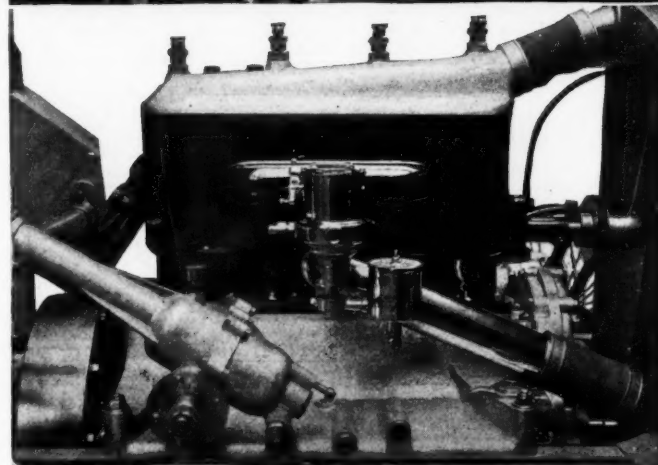
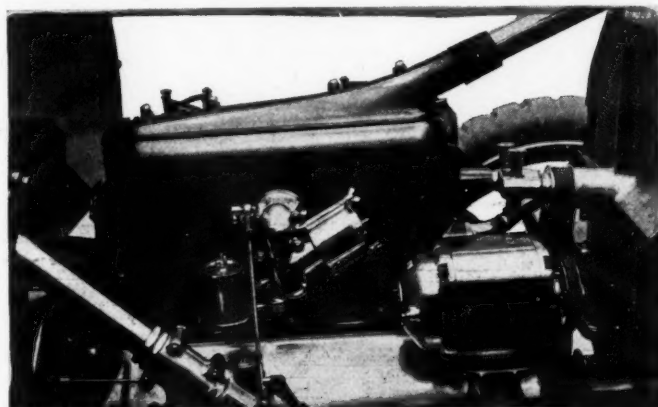
80 Per Cent. Block Motors

Block casting of motors is now general. The percentage of single castings is probably as high as 75 or 80, the remainder being big motors cast in pairs. Not a few firms carry the whole of their series in block castings, this including motors as high as 4 inches bore. Berliet is a good example. There are practically no single castings left with the exception of the big Panhard-Knight motors. Sixes are more often in groups of three, as in the case of Delaunay-Belleville. Brasier and Delage cast their sixes in one block.

Thermo-Syphon-Pump Tug-o'-War

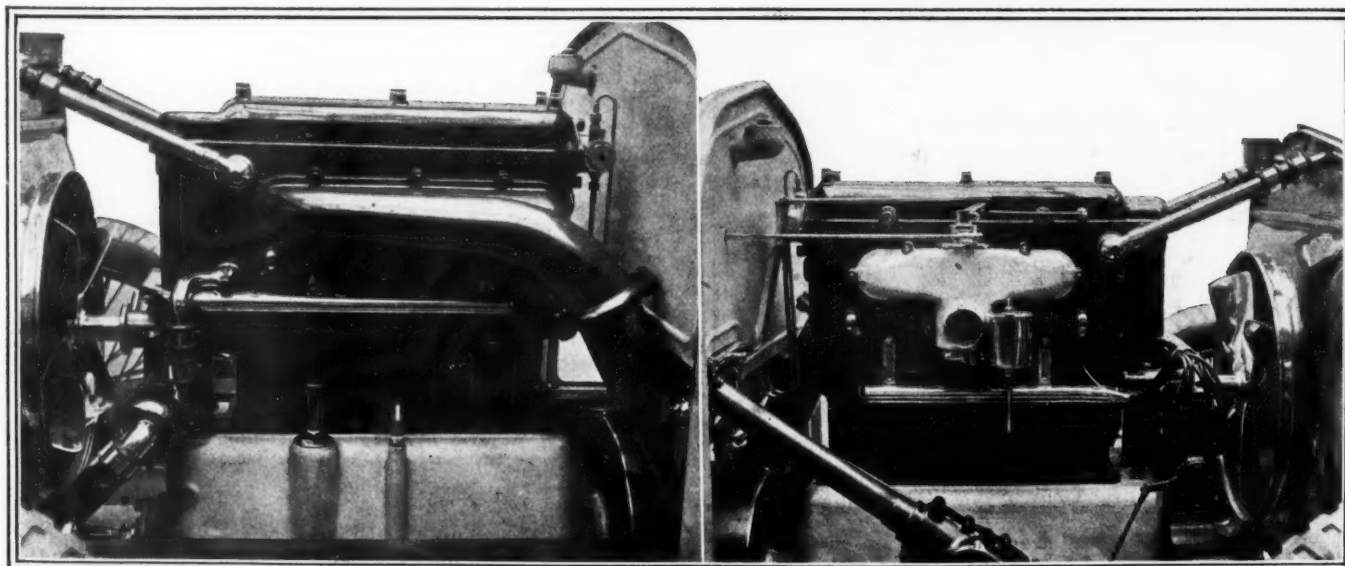
Thermo-syphon water circulation appears to have reached its height of development last year. Probably numbers are about equally divided, but there have been a few desertions from the

thermo-syphon camp, and the new comers in the automobile field more often rely on a pump than on natural flow. Darracq has taken to the pump for all models, Panhard has abandoned thermo-syphon on the few models on which it was tried; Gregoire has preferred to add a pump on its new high-efficiency types, Bayard-Clement uses a pump on the latest car. The leaders in the thermo-syphon camp: Renault, Charron, Delage, etc., have not made any change. The pronounced tendency is towards pointed radiators.

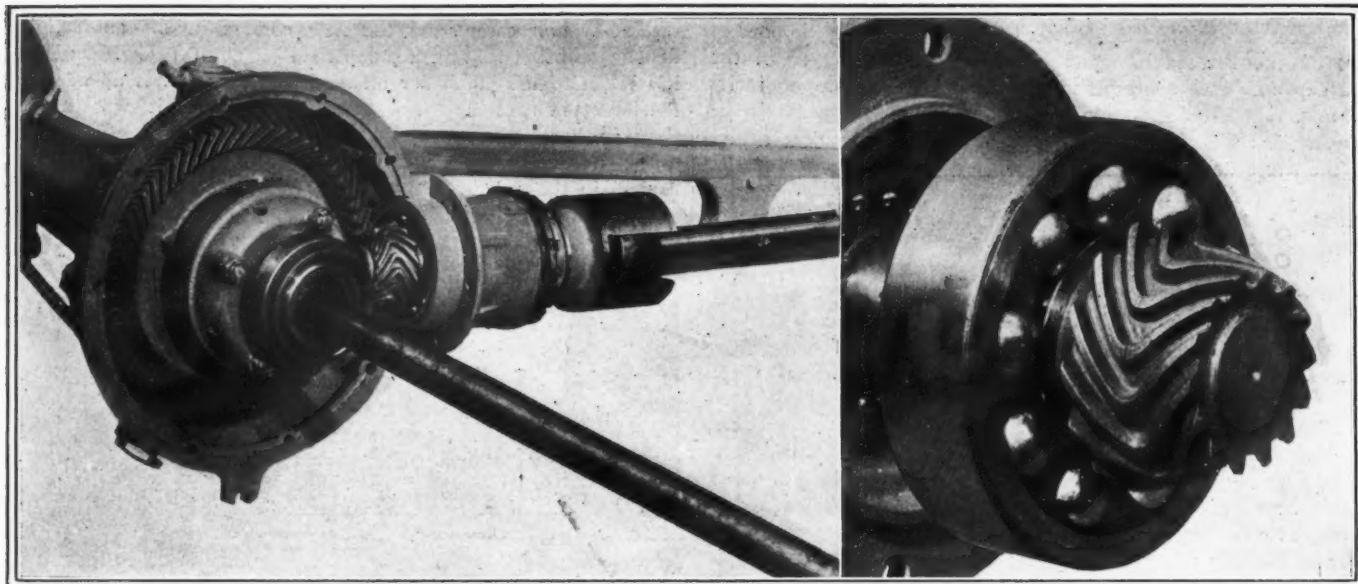


Darracq new L-type motor with belt-driven generator. Note absence of intake manifold

New Sizaire-Berwick motor with thermo-syphon cooling



Exhaust and intake sides of new Hispano-Suiza valve-in-the-head motor with valve mechanisms entirely inclosed. Transverse shaft drives motor and water pump. Note two return pipes to radiator and radiator filler cap under hood



Citroen double helical drive used on Mors, Gobron and Minerva. This has claimed quietness of worm drive



Rear axle of 12-horsepower Charron with underslung springs and double set of rear axle brakes, the latter new with this concern
Gregoire sporting type with two sets of expanding brakes and air-cooled brake drums. Note cable brake connections

Double cantilever rear spring suspension on Bayard-Clement, an innovation with this concern

Worm Gear Makes Progress—New Axles

**Double-Helical-Gear Type of Axle
Used by Mors, Minerva and Gobron
Claims To Eliminate Axle Thrusts**

WORM drive is not a particularly prominent feature on the new models. It is being adopted on all the Bel-lengers on about 70 per cent. of the Darracq production, and other Continental firms using it for one or more of their models, but not for the entire output, are Gregoire, Peugeot, Brazier, Minerva, etc.

Double-Helical Axles Used

The novelty of the season is the double helical or herringbone gear produced by Citroen and adopted for the entire output of Mors and Gobron cars and for a large number of the Minervas. This gear has been in use for practically 12 months on the Mors cars, but it has only just been offered to the general automobile trade. It is being experimented by practically all the leading factories with possibilities of its near adoption by some of them. At the present time Citroen supplies the gears cut in his own shops, but arrangements are being made for supplying the special machinery necessary for cutting these gears. The double helical gear is not at all new, the Citroen company, having been producing them for years particularly for very big reductions. The new feature is the application of these gears to automobile purposes.

It is widely recognized that silence is secured by the use of helical gears, but the disadvantage of considerable axial thrust makes their use impossible for anything but the auxiliaries of the motor. It was with the object of getting the silence of the ordinary helical gear without any of its thrust, that the Citroen double-helical gear has been developed. Up to quite recently the absence of special machinery has made it impossible to produce double helical gears otherwise than by casting or by cutting the two halves of the teeth separately and assembling afterwards. In this latter case the angle had to remain small on account of the cutters used and it was a difficult matter to assemble accurately. The Citroen machines employ special cutters and

allow the production of double helical bevel gears. The inclination of the teeth can be varied at will without any modification in the machine, but it is generally 45 degrees for cylindrical gears and 52.5 for bevel. It is possible to obtain these angles without modifying the profile of the teeth.

98 Per Cent. Double-Helical Efficiency

It is claimed for the Citroen gears that there is no axial thrust, that frictional losses have been reduced to a minimum and consequently efficiency has reached the highest point. Laboratory tests with gears having a reduction varying from 1-1 and 1-10 show an efficiency never less than 98 per cent. and sometimes as high as 98.7 per cent. Perfect silence is secured, and there is an entire absence of shock and vibration. Wear is declared to be almost nil, without any special care being taken in the lubrication, by reason of the small friction and the absence of circumferential play in the teeth.

Mors and Minerva are using the Citroen gears in the rear axle only. Gobron is using it in the rear axle of the shaft-driven models, and for the constant meshing pinions and for the drive of the jackshaft on a chain-driven sporting type car. With this they claim to get a car as silent as the ordinary shaft-driven model.

Brakes in the Spotlight

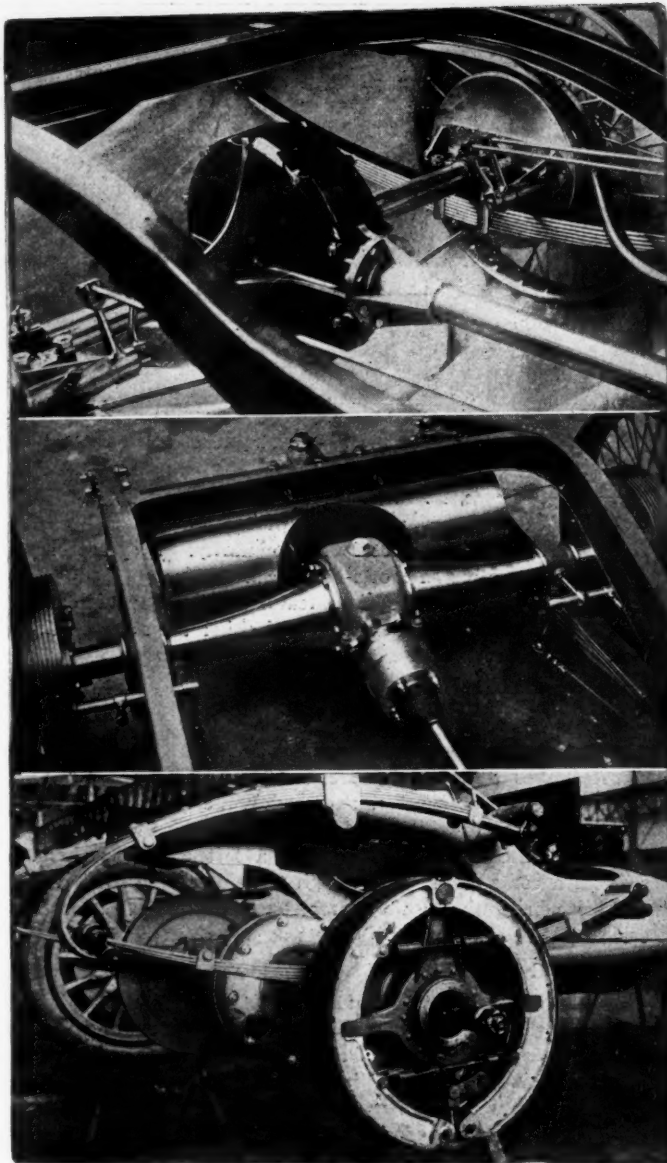
Few parts have received such attention as brakes. Practically all manufacturers have realized that their models left something to be desired in this respect, for there is hardly a firm which has not carried out improvements. Some of the latest brake drums are enormous. On the Sizaire-Berwick the drums measure 13.4 by 1.65 inches. These drums are machined all over, have deep fins, and the aluminum shoes are lined with Ferodo. The brake drum on the rear of the gearbox is skeleton, with aluminum fins bolted on it to assist in drawing air from under the bonnet.

On the Charron 12 horsepower car, with a motor of a little more than 3 inch bore, the brakes are side by side on the rear wheels, with drums measuring 16 by 3.7 inches.

Gobron has three sets of brakes, on the rear of the gearbox, and two sets side by side on the rear wheel drums. The differential brake has the peculiarity of having its shaft supported at both ends. There is a double ball bearing on the front of the shaft and in a bracket to the rear of the drum another ball bearing.

Turcat-Mery has a differential brake internal expanding ribbed drum type, measuring 14 inches by 3.7 inch. The rear wheel brakes on the other hand are comparatively small.

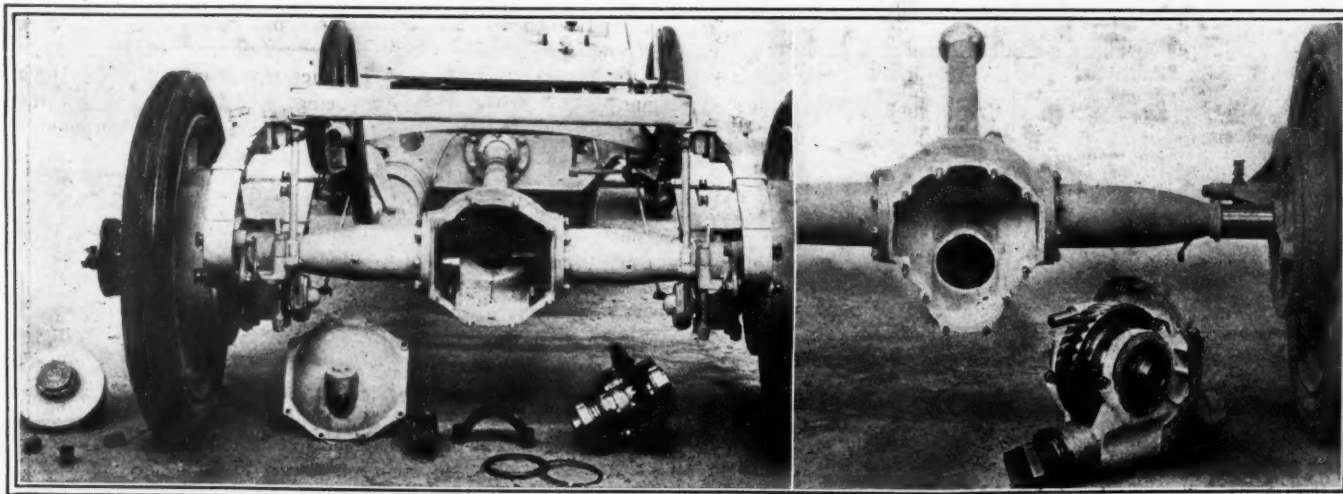
Since last year, when there was a decided tendency towards double brakes on the rear wheels, this system has not made very much progress. It has been adopted by Bayard-Clement on its latest touring model, by Barree on a light car, and is retained



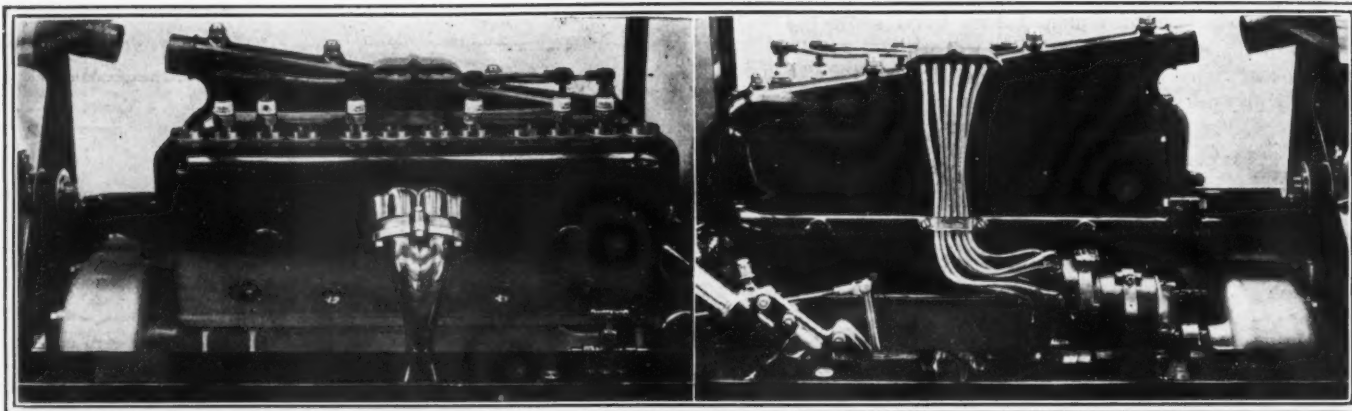
Rear axle of 8-horsepower Charron with light, heavily-webbed differential housing, underslung springs and double brakes

Robust axle on Sizaire-Berwick, with underslung springs and brake support above springs. Note bell type housing

Panhard's new side-by-side rear wheel brakes and seven-eighths spring system



Peugeot's new axle for bevel and worm drive, showing both dismantled. Note large diameter housing and underslung springs which take the drive



New Delage six, one of the best examples of block casting at the show. Note accessible valve cover and intake water pipe

by Panhard, Gregoire, D. F. P. La Buire retains its brake on an extension of the drive shaft, back of the axle.

Front wheel brakes have not found popularity. They are only to be found on one model Isotta-Fraschini.

About 50 per cent. of the Continental makers have internal brakes with ribbed drums at the rear and either the same on the gearbox or external brakes with ribbed shoes.

Simplicity in Brake Adjustment

Brake adjustment has also received a considerable amount of attention. Numerous ingenious devices have been brought forth to adjust brakes without the use of tools. One very good method is that used on the Sizaire-Berwick, the two ends of the cables being carried into blocks sliding freely in a cross tube and these blocks united by a spindle have a left and right hand thread with a control brought through the side frame so that it is possible to bring the blocks closer together and thus shorten the cable. This arrangement also acts as equalizer.

Lost—the Six-Cylinder Motor

The six-cylinder motor is hard to find in the Paris Salon. With the exception of Delaunay-Belleville who has increased his number of sixes and is now producing more of this type than of fours, the Continental makers have almost abandoned the six. Rolls-Royce is showing but one model with a six-cylinder motor. Daimler has a couple of sixes, Packard and Hudson show sixes only, and all the others are specializing on fours.

Excluding these English and American firms, there are only twelve manufacturers producing six-cylinder motors. Several

of these are not even taking the trouble to show them and produce them in such small quantities that they really may be ignored.

The six-cylinder motor has never been very popular on the Continent, and it must be admitted that it has lost ground during the past 12 months. The objections that are brought against it on the part of the owner are high fuel cost, excessive overall length, and periodic vibration. There is also the feeling that the six has never proved itself the equal of the four on the score of efficiency as judged by racing.

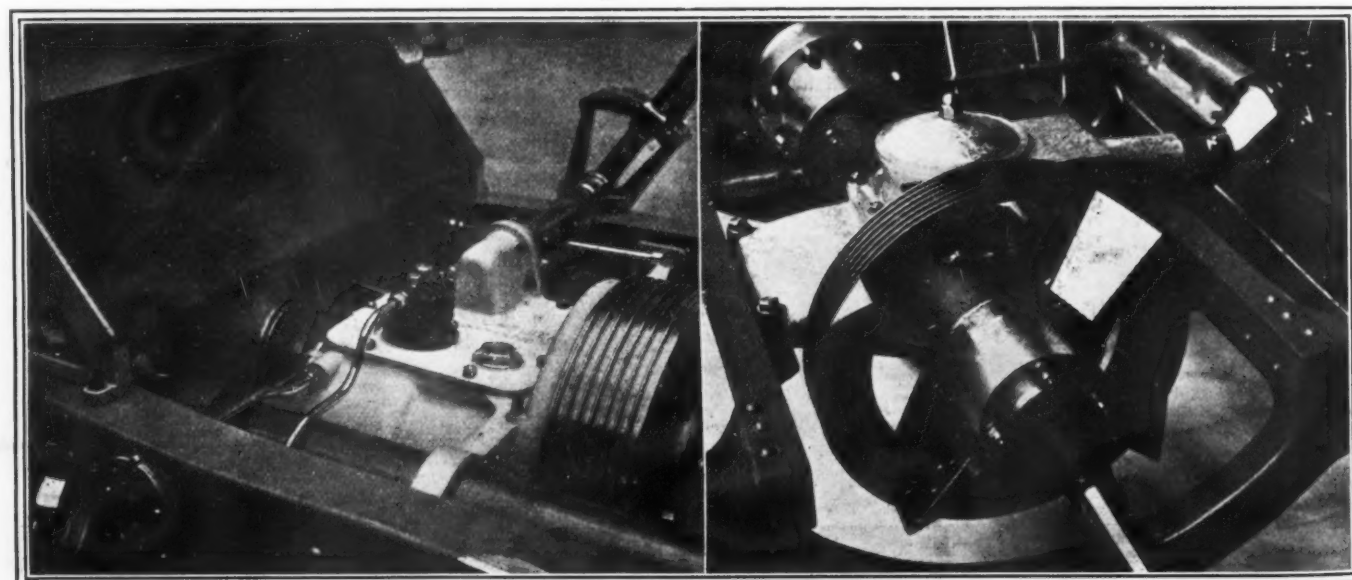
Delaunay the Six Exponent

Delaunay-Belleville, who is undoubtedly the leading maker of sixes on the Continent, announces this type exclusively for 1914-1915. There are two four-cylinder types in the catalogue, and they will probably be continued for a little while, then dropped. For the new models the stroke has been lengthened. The 78 by 140 is a new type; the 85 by 130 will be replaced by 88 by 150, and the 100 by 140 is being increased to 103 by 160 millimeters. All the motors have cylinders cast in two groups of three.

Delage has specialized in a small six, bore and stroke being 65 by 130 millimeters. This is a block casting with valves one side, and thermo-syphon cooling. The crankshaft is carried in three bearings.

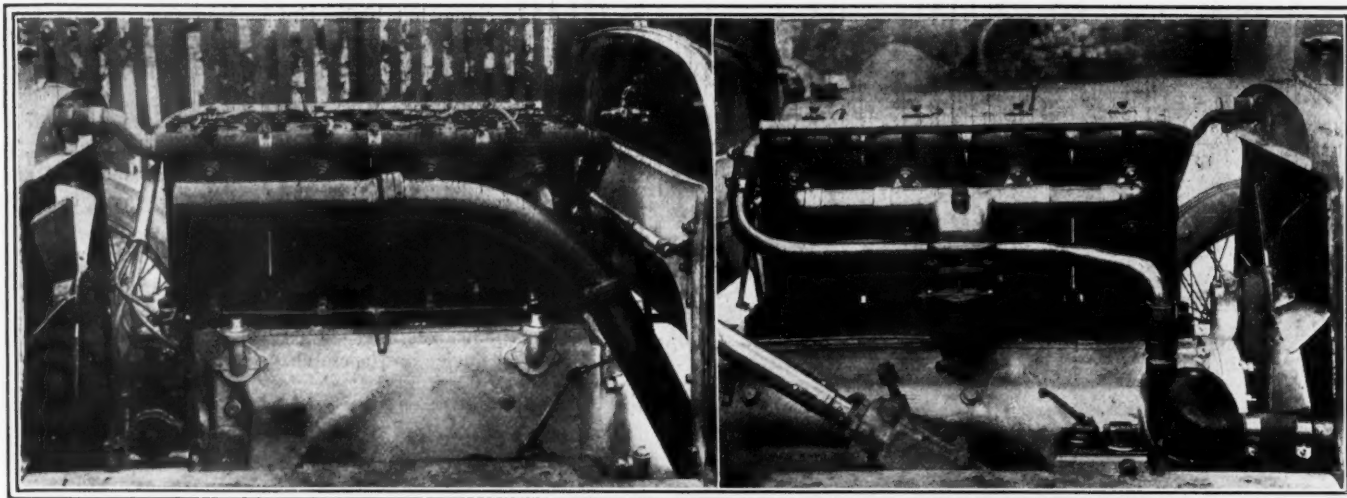
Bad Roads Make Better Springs

Suspension has been given close attention, the makers' attention having been called to this by the poor condition of the main



Hispano-Suiza with power tire pump on gearbox and air connection through side of frame

Sizaire-Berwick with cooling fins and integral flanges on gearbox brake. Note gearbox mounting on subframe



New 20-horsepower sporting type Panhard-Knight with transverse shaft driving magneto and water pump

road surfaces, the faster average speeds, and the greater desire for comfort.

The platform type of spring has practically gone out of use, the only firm of importance still using it being Delaunay-Belleville.

There is not an elliptic spring to be found in the show.

Three-quarter elliptic springs have decreased in number and semi-elliptics have increased.

It may be taken that the semi-elliptic is the most popular type at the present time.

The great majority of the cars shown this year have longer and broader springs with thinner leaves. Sizaire-Berwick, on a medium five-passenger car has rear springs 2.7 inches in width by 57 inches in length. The leaves are very thin and vary in number from 15 to 20. They are seated under the axle and directly under the frame members. This method of carrying the springs under the frame and under the axle is also used by Charron and by S. C. A. R., Piccard-Pictet, with a car about the same weight as the Sizaire-Berwick, has springs 2.3 inches in width and 58 inches in length.

On the Delaunay-Belleville models the springs are 2.5 inches wide at the rear and have fifteen leaves.

Renault has particularly wide springs, 2.8 in width by 60 inches in length, semi-elliptics. This type of suspension, as adopted on the Renault, is accompanied by a kick-up over the

axle and a sweep down at the rear. It has been adopted by numerous others among them Peugeot and Darracq.

Berliet Fits Cantilever Springs

Cantilever springs appear to be coming into favor. The only European firm of any importance having used them up to the present is Rolls-Royce. This year for the first time they are shown on one of the Berliet models and it is declared they will later be applied to all the cars produced by this firm. Bellenger has adopted a similar type of spring.

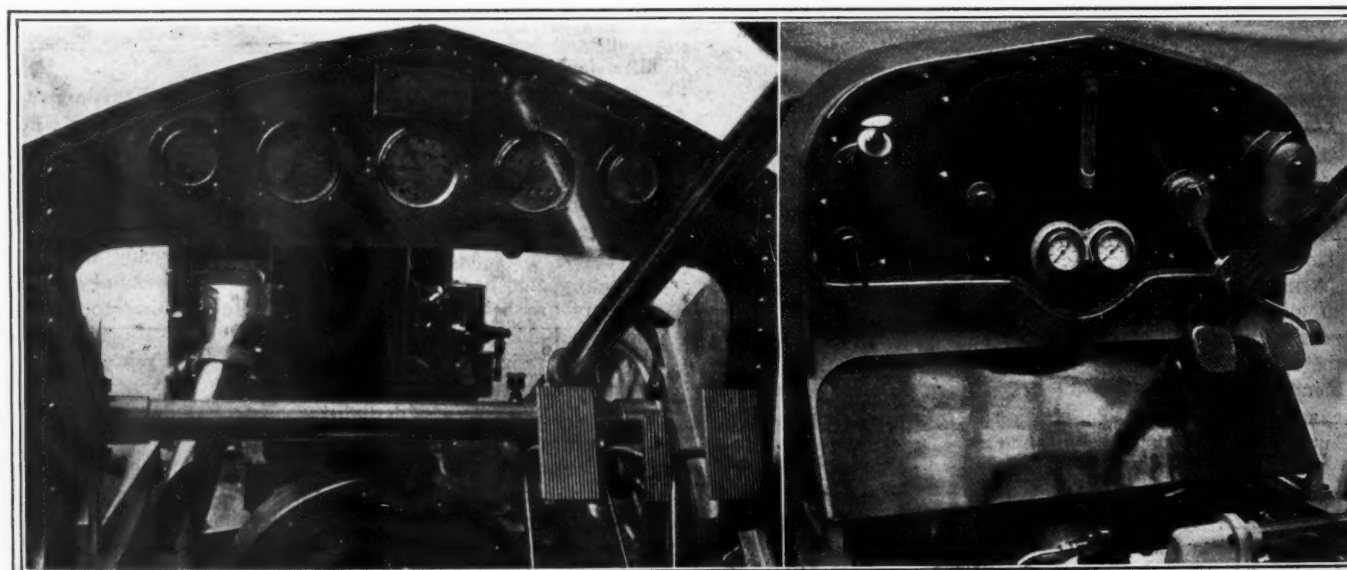
Clement-Bayard has a double cantilever spring, one of them being secured at the top and the other below the axle housing.

The objection made to three-quarter elliptic springs is that they set up side sway preventing the car holding to the road in the same manner as a semi-elliptic. Where three-quarters are employed it is becoming more common to make the upper portion shorter than formerly, to make the lower portion flat under load, to place it under the axle, and attach the upper part below the top of the frame member. The new Unic is an example of this.

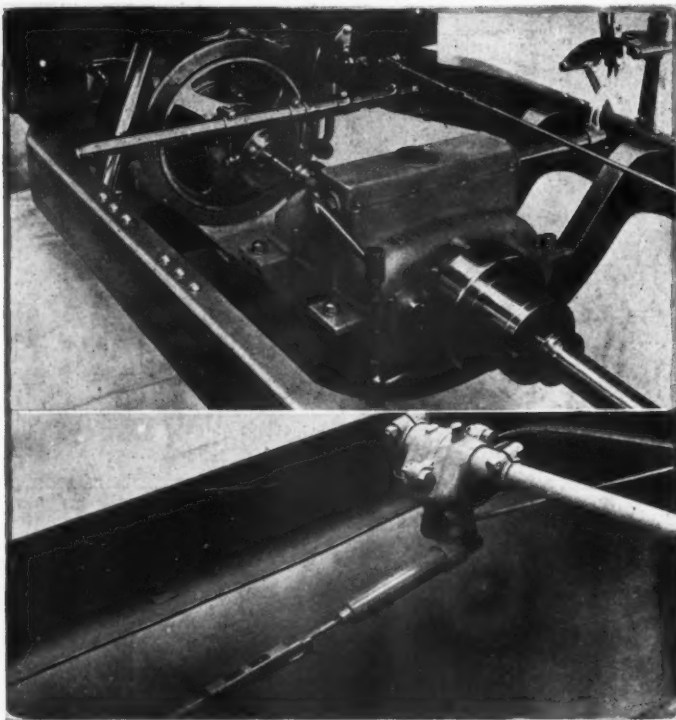
High-Tension Magnetos Are 100 Per Cent.

There is not much to be said about ignition. A high-tension magneto is found on every European car in the show. Double ignition is as obsolete as the dodo.

Dual ignition with one set of plugs is found on less than 1 per cent. of the cars.



Two examples of compact dash arrangement. At left, Sizaire-Berwick with oil, crankshaft r.p.m., clock, speedometer and fuel pressure gauges. At the right, wood face on aluminum dash of Hispano-Suiza



Gearbox on six-cylinder Delage, showing expansion type emergency brake. Quick brake adjustment on Hotchkiss, together with differential-gear type of equalizer. The adjustment is by turn-buckle with latch locker

On the high-efficiency motors there is a tendency to fire two plugs simultaneously. Racing experience shows that for big motors this is decidedly advantageous, but that the gain in power is very slight on motors of small and medium size. The principal firms adopting this plan are Hispano-Suiza for their new valves-in-the-head motor, Gregoire for the high-speed T motor, and Chenard-Walcker for an L motor. In this latter case one set of plugs is mounted in the caps over the intake valves and the other in recesses specially formed on the water outlet pipe. Although the Chenard-Walcker motors are small, their engineers claim to get an appreciable increase in power by the use of double plugs.

In place of fixed-spark ignition, which was very common on the cheaper range of cars, there is a tendency to adopt the automatic advance magnetos. Renault has made this change. Water proof magnetos are used by Delaunay-Belleville, but have not caught on as much as might be expected; they do not appear to be used on more than 10 per cent. of the cars.

Transverse Magneto Shaft Leads

There are two general methods of mounting magnetos: on a cross shaft in front of the motor, the same shaft generally driving the water pump, and alongside the motor, the magneto being behind the timing gear housing and the water pump ahead of it. This latter method is used on the new Darracq, where the magneto has a leather coupling and the pump casing is cut away to allow any water leakages to run clear away without any possibility of getting inside the crankchamber. On this motor there is no adjustment for the packing gland of the pump, this being kept tight by an internal spring. Delahaye is another example of the longside position; Sizaire-Berwick is another, but in this case there is no pump.

The cross shaft location appears to have a slight numerical advantage over the longside position. The former is found on Fiat, Diatto, Piccard-Pictet, Bellenger, La Buire, Peugeot, etc.; also on Turcat-Mery, Bollee and Berliet, although these cars have no pump.

The Hispano-Suiza is a good example of a cross shaft, for in this case it is driven by helical gears from the front vertical

shaft, and is somewhat higher in position than usually found.

Renault has changed the position of his magneto to alongside, in order to be able to place the electric lighting dynamo right in front.

An unusual position is the driving of the magneto off the front end of the crankshaft, as done on the small Charron. The starting handle has then to be put on the camshaft. It is a simple arrangement and quite satisfactory for small cars with the radiator on the dashboard.

S.P.A. has a cross shaft for the magneto and the water pump inside the front end of the cylinder casting. The pump shaft receives the two-blade fan, thus abolishing the use of a belt. Another mechanically driven fan is the Hispano-Suiza, fitted with a friction device and a clutch.

Clement Magneto Accessibility

Magneto accessibility has been developed to extreme limits on the new Bayard-Clement. This motor has radiator on the dashboard. The timing gears are chain driven, and the magneto is set out ahead of the timing gear housing and above the level of the frame. By its side is the electric lighting dynamo, driven by an enclosed chain from the magneto shaft. The carbureter is also brought out in front, just to the right of the dynamo and several inches ahead of the front cylinder. The three organs—magneto, dynamo and carbureter—are thus in a line and close to hand when the bonnet is lifted. This location of the carbureter makes it necessary to have an exceptionally long, straight intake pipe running in front of the cylinder casting and having two branches to the intake ports.

Intake Manifold in Cylinder Casting

The general tendency is to incorporate the intake manifold with the cylinder casting. This is the natural outcome of the L-type motor, for it allows the carbureter to be placed alone on the right hand side of the motor, with the carbureter bolted up direct to the casting. This leaves the valve stems perfectly accessible.

Renault has adopted this system on his new 18 horsepower car, thus freeing the valve side of all piping; it is also used on all the Hotchkiss cars and on the latest type Darracq. This arrangement abolishes all visible hot air pipes, for if it is required to warm the primary air, it can be done very easily by passing a pipe between the base of the second and third cylinders into the valve stem chamber. This is done on the Darracq with certain types of carbureters.

Makers appear to prefer to use stock carbureters. The most popular makes are Zenith and Claudel. A few English carbureters, among them S. U. and Smith, have recently got on the French market.

Electric Lighting the Big Show

The slide towards electric lighting is a most notable feature of this year's show. For some time the public has been willing to accept electric lighting, but makers have not shown any enthusiasm in forcing it on them. Recently a company has been formed under the title S. E. V. (Société Éclairage des Voitures) to develop rights held by the Thomson Houston Co. Renault is a strong financial backer of this company, the details of the dynamo have been worked out by his staff, and naturally his cars are being equipped with it. In addition to Renault, the stockholders in this new company comprise many of the most influential motorcar manufacturers of France. Having shares in an electric lighting company, they are naturally interested in selling cars with lighting outfits. Other firms not in this company have had to come into line and fit their cars with some dynamo on the market, or adapt them in such a way that a dynamo can be installed with the least possible trouble.

About 30 per cent. of the cars in the show have electric lighting as a standard equipment; another 50 per cent. endeavor to force it on the customer by putting it on the chassis and only making a small allowance if it is not wanted; the remaining 20 per cent. do not offer anything in the way of electric lighting.

The situation is quite different from America, for here very few cars are sold complete, and when a chassis only is being bought it is difficult to force in an electric lighting outfit if it is not wanted.

Darracq appears to be the only firm selling a completely equipped car with electric lighting and giving no option for taking it without this equipment. Renault, Hotchkiss, Unic, Panhard, Delaunay-Belleville, Bayard-Clement, Berliet, Pilain are a few of the firms making a specialty of electric lighting.

There is infinite variety in the methods of driving dynamos. A good, and at the same time typical method is that on the Berliet. A friction wheel, the shaft of which is carried in a bearing on the aluminum dashboard, is maintained in contact with the flywheel by a coil spring. A pulley on the front end of this shaft, and on the motor side of the dashboard allows of belt drive to the dynamo, which is mounted within the dashboard. One-half of the dynamo is on the driver's side and the other half on the motor side of the board.

Self-Starters Go Begging

Self-starting is in quite a different position from electric lighting. The need for an automatic starter does not appear to have been felt and the firms offering it as a standard equipment are remarkably few. On the Berliet just mentioned it is included, the electric motor being mounted on a platform along side the gearbox and driving through helical gearing and an enclosed chain to the clutch shaft.

Renault has fitted an electric self-starter to two of his town cars, but not to his touring models.

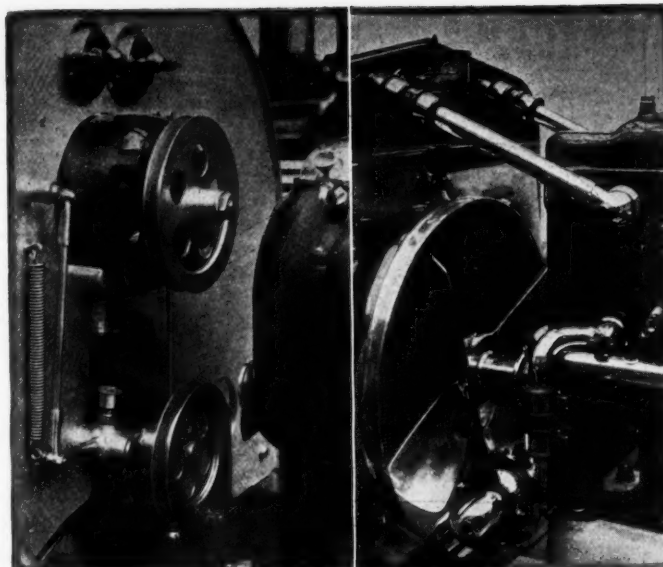
Darracq has made provision for an electric self-starter as an extra.

Delaunay-Belleville is offering a compressed air self-starter, but selling few.

Brasier has electric lighting and self-starting on a six-cylinder model, as well as a power driven tire pump.

Detachable Wood Wheels Realities

Detachable wood and detachable steel wheels are now proving a serious rival to the wire wheel. While the wood and steel types are not quite as quick in changing when new as the well-



At the left, generator in dash on Berliet 40, together with driving pulleys. At the right, Hispano-Suiza motor, showing V-type radiator, filler cap under bonnet and double water return pipes

known wire wheels, there is not much difference when the two sets have been on the road for 6 months. The advantages of the wood and steel types are lower cost of production and ease in cleaning. Wire wheels find little favor with chauffeurs and men who wash their own cars.

Renault is supplying all his cars with detachable wood wheels as a standard; Darracq is doing the same; Bayard-Clement is making the Sankey steel detachable wheel; Delaunay-Belleville sell about 75 per cent. of their cars with wire wheels; the same proportion is observed by Hotchkiss. Peugeot is a large user of wire wheels. Unless they have a particular make of wood detachable wheel that they wish to push, makers do not offer any objection to supplying wire wheels, although this nearly always entails an extra charge to the customer.

French Motor Sizes for the Last 3 Years

1912 Bore and stroke, m.m.	1913 Bore and stroke m.m.	1914 Bore and stroke m.m.	Bore and stroke Inches	S.A.E. h.p.	Method of casting cylinders	1912 Bore and stroke, m.m.	1913 Bore and stroke m.m.	1914 Bore and stroke m.m.	Bore and stroke Inches	S.A.E. h.p.	Method of casting cylinders
ABADAL						BELLENGER					
.....	.....	80x180	3.15x7.09	16.2	Bloc T	.....	.....	80x130	3.15x5.12	16.2	Pair Knight
ALCYON						.....	.....	90x130	3.54x5.12	20.3	Pair Knight
75x120	75x130	65x120	2.56x4.72	10.00	Bloc T	72x120	No change	70x120	2.76x4.72	12.00	Bloc L
80x130	No change	75x120	2.95x4.72	14.20	Bloc T	80x130	No change	80x130	3.15x5.12	16.20	Bloc L
.....	.....	85x120	3.35x5.12	18.20	Bloc T	90x140	No change	Not made	.....	.....	.....
ALDA						.....	95x140	95x140	3.74x5.51	22.40	Bloc L
.....	.....	85x140	3.35x5.51	18.20	Bloc L	125x150	No change	120x144	4.72x5.67	36.30	Bloc L
AQUILA ITALIANA						.....	130x160	125x150	4.92x5.91	39.70	Bloc L
.....	.....	70x120	2.76x4.72	12.00	Bloc head	.....	130x190	130x160	5.12x6.30	37.70	Pairs head
.....	.....	80x130	3.15x5.12	16.20	Bloc head	.....	185x200	130x190	5.12x7.48	37.70	Pairs head
ARIES						.....	.....	185x200	7.28x7.87	85.00	Pairs head
60x100	No change	Not made	.....	.....	.....	BERLIET					
65x100	No change	65x100	2.56x3.94	10.00	Bloc L	70x100	No change	70x100	2.76x3.94	12.00	Bloc L
75x140	No change	75x140	2.95x5.51	14.20	Bloc L	80x120	No change	80x120	3.15x4.72	16.20	Bloc L
84x130	No change	84x130	3.31x5.12	17.80	Bloc L	.....	90x140	90x140	3.54x5.12	20.30	Bloc L
105x160	No change	90x150	3.54x5.91	20.30	Bloc L	100x140	No change	100x140	3.94x5.12	24.80	Bloc L
BARRE						120x140	No change	120x140	4.72x5.12	36.30	Bloc L
65x110	65x110	60x100	2.36x3.94	8.00	Bloc L	BOLLEE, LEON					
75x120	Not made	65x110	2.56x4.33	10.00	Bloc L	83x110	No change	75x110	2.95x4.33	14.2	Bloc L
75x130	No change	75x130	2.95x5.12	14.20	Bloc L	95x130	Not made	83x110	3.27x4.33	17.2	Bloc L
.....	.....	80x140	3.15x5.12	16.20	Bloc L	.....	Not made	.....	.....	.....	.....
.....	.....	90x150	3.54x5.91	20.30	Bloc L	106x130	Not made	.....	.....	.....	.....
BAZELAIRE						125x150	Not made	.....	.....	.....	.....
75x100	No change	75x130	2.95x5.12	14.20	Bloc L	130x150	Not made	.....	.....	.....	.....
76x120	No change	84x120	3.31x4.72	17.80	Bloc L	BOZIER					
84x130	No change	85x120	3.35x4.72	18.20	Bloc non-pop	67x110	Not made	70x130	2.76x5.12	12.00	Bloc L
BEDELIA						65x130	No change	76x130	2.99x5.12	14.60	Bloc L
.....	.....	76x 85	2.99x3.34	3.65	Single	75x130	75x130	76x130	2.99x5.12	14.60	Bloc L
.....	.....	80x100	3.15x3.94	4.05	Single	75x150	No change	90x140	3.54x5.51	20.30	Bloc L
.....	.....	80x100	3.15x3.94	8.10	Twin	(Continued on page 833)					

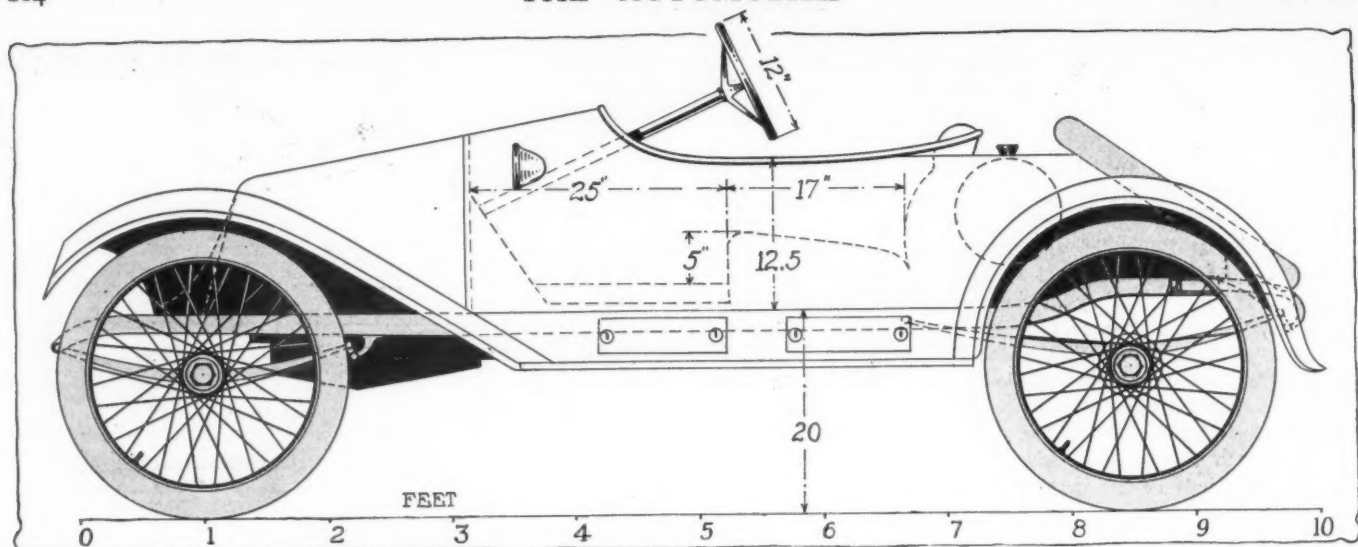


Fig. 1—Side elevation of cyclecar with deck folded, concealing seat for third person, and allowing extra wheel to fold over toward tank

A Three-Passenger Cyclecar Design

Suitable Body for Either Air or Water-Cooled Type—Is on Roadster Lines—May Be Built from Illustrations

By George J. Mercer

THE cyclecar, on account of its narrow track and minute proportions, can be made cheaply and at the same time there is enough money in it as a manufacturing proposition so that it can be made to look well. The time seems to be opportune for its introduction, because every day more buyers are coming over to the economical upkeep and expenditure class.

In order to hold its own after the first enthusiasm wears off, the cyclecar must be made of staying qualities. The cost to the customer at the first will not be such an important item as many imagine and there is room to put proper manufacturing qualities into it and then ask a fair price, rather than incorporate freak ideas that are liable to cheapen the result.

The automobile has become a staple article and its gradual development has eliminated many theories, so that now it is easy to copy reliable, standard cars that have stood the test of time and, by reducing the proportions to the proper size for a cyclecar, have an article to offer the public, that can by comparison,

be judged by cars that have been perfected by prudent tests and reliable calculations. This is the type of cyclecar that will hold the attention of the buying public.

The prices of some of the best cyclecars in Europe are higher than the price of the cheap American automobile and recent importations into this country have been sold for more money than a good, medium-priced automobile will command.

This article shows a suitable body design mounted on a chassis of the average accepted type, and the illustrations give a clear semi-working layout, so that it will be easy to build a body from the design given.

The chassis has wire wheels with 28 by 2.5-inch tires, the wheelbase is 90 and the tread is 36 inches. The front springs are 28 inches long and the rear springs are three-quarter elliptic and are 36 inches long. Height of the chassis from the ground is 20 inches and the clearance is 10. Rear axle is gear-driven and the ratio is 4.5 to 1 on high speed.

The motor is four-cylinder, four-cycle with 2.5 by 3.5-inch bore and stroke, developing 10 horsepower. Left drive with center control is used and there are three speeds forward and reverse. The foot brake is the emergency brake to the rear wheels and the car as shown has a mechanical starter. The gasoline tank at the rear has pressure feed with a capacity of 9 gallons of gasoline and 2 of oil, the filling plugs projecting through the deck.

The body design, Fig. 1, is the roadster type and everything possible has been done to eliminate wind-resisting surfaces. The hood is novel in design and in manner of operating, and blends well with the body lines. This hood looks as though designed only for an air-cooled motor, but if required it can be

used for a water-cooled motor, by simply putting the radiator back of the grill and under the hood. This arrangement will save some in cost, as the radiator need not be finished to show. The construction of the hood is from one piece of 18-gauge aluminum and at the front it is formed over to meet the grill opening. This arrangement of hinging, Fig. 4, allows the metal sheet to be made without cuts or sections for hinges, and therefore when painted it will show a clean, unbroken surface. When made in quantities the hood is not expensive, while the hinges, being concealed and with an arm that travels in a radius, allow the hood to be raised so that all parts are easily and quickly accessible. This hinge will lock the hood when down at the rear and

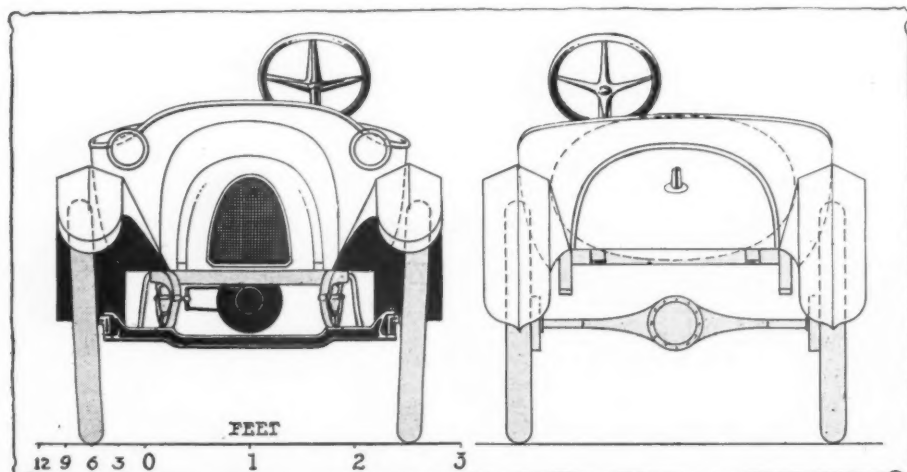


Fig. 2—Front view, showing starter. Fig. 3—Rear view, showing spindle for extra wheel

at the front, it is only necessary to have fasteners at the two front corners. Looking at the plan view, Fig. 5, it will be noted that there is a pan that extends across the forward points of the hood back to the grill and connects with the wings of the mudguards to keep the mud splashed from the front wheels getting into the grill openings.

This body is made without doors, and to enter it is necessary to step over the sides. The running board is high to make the step up as easy as possible and there is a removable leather pad to protect the top edge of the body when stepping over. The car is so low that when standing beside it, to step over the side is not difficult. The body with-

out doors is an assistance in supporting the frame, which is very light and besides it is quite an item saved in the manufacturing cost. The capacity of the body is for two on the driving seat, this seeming a better and more satisfactory plan than the tandem idea, and in addition there is room for one person on the seat at the rear. This is simply a bicycle seat attached to the under side of the cover and when the latter is raised it comes automatically into position, Fig. 4. There are handle bars that are pulled into position after the occupant is seated and in order to provide leg room there are comfortable pockets on each side of the driveshaft.

This body, if made in quantities or singly, will probably be made in two pieces, each piece being one side and the line of join being in the center of the body. For a single order aluminum is the only practical metal to use on account of the shape, but, for quantity, the best metal is sheet steel and this can be made so that no seams or joints will show. The sheet that forms the seat is put in after the shell is assembled, then the moulding is put on and the cover is fitted with lock and hinges, the hinges being below the opening so as to throw the cover well back to allow room for the extra seat. The cover is made to carry the one spare wheel and there is a dummy spindle on the cover for this purpose. This spindle is also used for throwing the bar that locks the cover. The only wood used for framing is the wood sills and the framing used for the trimming.

The mudguards are well worth attention, the top being V-shaped and the outer edge re-inforced with a short flange. This style of guard is used to some extent on foreign cars, is very strong and has all the advantages of the dome-shaped guard be-

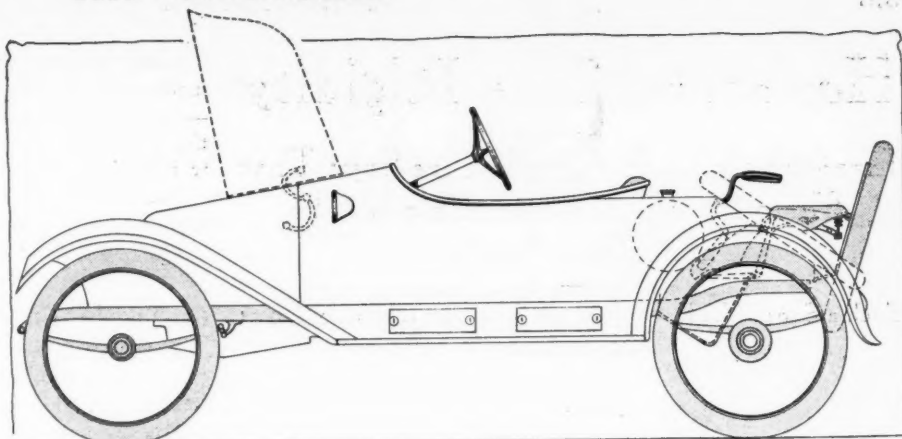


Fig. 4—Side elevation, showing how hood lifts and working of rear seat and extra wheel

sides being cheaper to build. There is a good stretch of running board on each side and back of the running board shield the space is used for a locker, the box forming the locker being also depended on to truss the frame of the chassis.

The chassis frame is channel shape and has a 2-inch kickup at the rear. In the plan view, Fig. 5, the frame shows parallel from the back to the dash, when it bends inward toward the points, thus making the necessary clearance for the front wheels to turn and at the same time forming the best line to allow for the graduation of the sides of the hood.

The trimming of the seat and back should be comfortable but not luxurious, and plain trimming is best, because there is no roll to the sides and back. Springs are used to shape the cushion and back and the covering should be leather of a soft, pliable quality. A very pleasing color of leather is red and it harmonizes especially well with a rich dark blue color combination for the body and chassis, black mudguards and mouldings and a fine line of red striping.

This style of body seems to be very suitable for introducing the cyclecar; it can be made cheaply in quantities; it is comfortable and strong and there are no loose parts to get out of order. The cover at the rear and the hood are the only hinged parts so that there is slight chance of rattles developing.

This body design can be built and used on a car that will sell complete for \$400 and the weight of which complete is 600 pounds. No top or windshield is shown on this design as at present these are not being given much consideration for this class of car. The horn is under the hood and the best provision for headlights is one small searchlight, operated by hand and mounted on the top of the cowl.

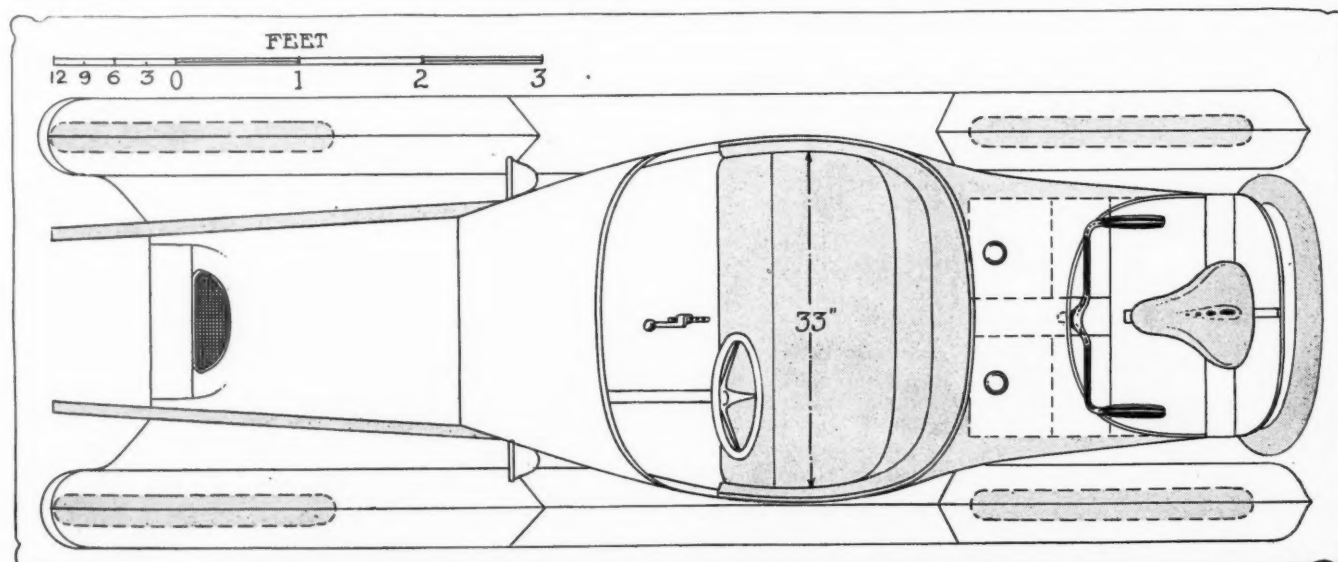


Fig. 5—Plan view of three-passenger cyclecar, giving an idea of the seating arrangement, control features and shape of the frame

Horizontal Tire Rigidity

Inventor of the Pneumatic Tire Says That Shoes Should Have Flexible Walls and Rigid Surface

Such a Shoe Would Greatly Outlast the Ordinary Type of Clincher

By J. B. Dunlop

DUBLIN, Ireland—Editor THE AUTOMOBILE:—With further reference to the article which recently appeared in THE AUTOMOBILE entitled "Comprehensive Tests to Develop Data for Improvements of Springs and Tires," being a brief digest of a booklet by Bobeth of Hanover, it seems rather curious that America should produce the slowest pneumatic tire and also the fastest, and that the fast tire was a natural development of the slow tire, both tires being composed of unwoven threads or cords.

The slow tire consists of a single layer of cords or threads extending directly across the thread of the tire, and the speedy tire consists of two layers of threads crossing each other at right angles and inclined to the rim at an angle of 45 degrees. The Palmer single-tube tire from America was the fastest tire that had been made up to the time of its introduction into England.

Moseley's of Manchester, however, subsequently manufactured an unwoven fabric, consisting of parallel threads crossing other parallel threads, and all held together by rubber solution. Tires were manufactured of this fabric which were somewhat faster than the Palmer of that date. The Palmer then had too much rubber between the two layers of threads, and therefore the tread surface of the tire was not quite so rigid horizontally as it otherwise would have been. The Palmer cord tire as made in England and now being introduced into America is a very perfect tire (if there are degrees of perfection), and there is a wonderful amount of ingenuity displayed in its process of manufacture.

Less Internal Heat in Palmer

There is not too much rubber between the cords, nor too much between the strands of the cords. There is less internal heat generated than in any other tire and consequently the tire ought to be the fastest. The obvious reason why the cord tire is faster than the woven is that the cords run in what might be termed a straight line. That is to say, the cords take the shortest possible course at a proper angle from one edge of the rim to the other and do not lie in a wavy line as the threads do in a closely-woven fabric.

There are other reasons why the Palmer cord tire ought to be faster and more durable than a woven-fabric tire. The objections to the Palmer are that it is too expensive to manufacture and that some people are of the opinion that it costs more per mile to run it than other first-class tires. Probably the gasoline bill is reduced to some extent by using it.

Friction Heat Depends on Rubber

The heat generated between the tire and the road depends to a large extent on the quantity of rubber on the tread of the tire. Some years ago the Palmer double-tube bicycle tire lost a great deal of its inherent speed in consequence of the non-slipping ridges on the tread being unduly large and as a result the superior rigidity of the tread was to some extent impaired.

One fine feature of the Palmer cord tire is the fact that the cords are continuous and there is not the vestige of a hinge at any part.

There appears to be no reason why a tire should not be made which would in some measure be superior to the Palmer—the walls more flexible, its surface still more rigid and the tire still more durable and as cheap and probably more easy to manipulate than the ordinary so-called clincher.

There does not seem to be any way of using a softer pumped tire to advantage except by using a larger tire. Making the side walls more flexible will not enable us to ride on softer inflated tires.

Races Important in Cycle World

For a number of years prior to the introduction of the pneumatic tire there was great rivalry between the leading cycle manufacturers in the principal countries of Europe and in America. For advertising purposes the importance of winning races on road and speedway was recognized, and large sums of money were expended in order to secure the best riders.

If any of the rival companies had appreciated the advantage of horizontal rigidity in a tire, they would have used broader and thinner tires, and the first to adopt such tires would have swept the boards. However, for racing purposes, people were wedded to small, round-sectioned "boot lace" tires, and anyone who would have suggested a tire with much surface area on the road would have been considered unfit to be at large.

I shall defer my further remarks on the pneumatic tire and as to how it supports the rim of a wheel until next week, when I hope to send a photograph of one of the first racing pneumatic bicycles which was made twenty-four years ago and copies of which are now being printed.

Perhaps a very concise history of inventions relating to the vulcanization of rubber and the history of solid tires would be of some interest to the readers of THE AUTOMOBILE.

Care of the Tire Tread

Cuts in a tire are not, in themselves dangerous; just as a cut in a finger is not in itself dangerous, but a cut which isn't attended to will permit bacteria to enter the system and cause infection, so a cut penetrating the tread of a tire permits foreign substances from the road surface to enter and destroy the fabric. These foreign substances consist of two general classes—sand and moisture.

At every revolution sand is forced into the cut. The cut is soon filled, but the weight of the car above continues to force in more. Naturally the sand must move somewhere, and taking the line of least resistance it begins to spread out in every direction from the cut between the tread and the fabric, separating one from the other.

The first result is the so-called "sand-blister." These natural causes continue however, until the tread separation covers a larger space. It is not long before the tread tears loose.

Aside from this action, the sand contains moisture which is immediately absorbed by the fabric with which it comes in contact. This rots the fabric and rapidly weakens it. The result is a blow-out.

The remedy for these conditions is not as effective as the precaution which will prevent them. This precaution is simply to fill the cuts in the tread with repair gum immediately after they are discovered. An excellent plan is to spend a few moments each evening examining the tires. If an inspection reveals a few cuts in the tread, they should be thoroughly cleaned out with gasoline and then filled with repair gum, of which there are several good brands on the market. In the morning the repair will have dried and become an integral part of the tire. The process is a simple one, and the time spent in taking this precaution will repay every automobile owner many times, through the savings in tire expense.—F. A. HENDERSON, Manager Adjusting Department, Goodyear Tire & Rubber Co., Akron, O.

Preserving Car Finish

More Attention to Housing Must Be Given—Slightly Warm Water Preferred for Washing

After Summer Service Varnished Surface Will Be Worn Thin—Correct Method of Treatment

JUST at this time, as perhaps at no other time during the year, the car should be given special attention looking to the preservation of the finish. It has probably come through the summer and early autumn bearing up bravely under the ravages of a particularly hard service. The season has been dry, and the road dust and litter have blanketed the car and covered the finish.

The question before the car owner, therefore, is what treatment does the finish on the car require? This is a decision which he, or the painter must decide. Local conditions prevail in practically every case, making it difficult for an outsider to materially assist.

Autumn Varnishing Keeps Finish

For the average car which is used the entire year revarnishing is essential. An autumn and spring varnishing will serve to keep the finish upon the car intact and vital with life and luster, and in the end the economy of the practice will be beyond question.

More attention must now be given the housing of the car. A damp, cold garage, in which the ventilation is bad, and the light is equally poor, affords about the worst possible combination acting upon the finish that can be devised. While the garage should never be a highly heated building, it ought never to be a cold one. Air with the chill extracted, and from which the moisture has been expelled, and in which no poisonous gases exist, is desirable.

Usually the ventilation furnished from appliances and pipes coming through the roof, or above the line of the ceiling, will be found to furnish a purer supply of fresh, clean, wholesome air than is obtained from lower air strata.

Ordinarily the importance of light, and its effect upon the finished surface, is not given the consideration justly its due. French chemists have within recent years reaffirmed the deductions of an earlier generation of scientific men to the effect that light is the life of varnish just as it is the life of man. Close up the garage windows and a continuous storage of the car in this darkened space would result in permanent discoloration of the finish. Instead of retaining its natural color the varnish housed in dark quarters takes on an objectionable greenish hue to rid the surface of which it becomes necessary to rub the old discolored varnish down, and revarnish, and in many cases to re-color prior to varnishing. Light not only preserves the normal color of the finish, but also materially assists in counteracting the fading and changeable tendencies of the color under the varnish.

Keep Car in Specially-Planned Garage

Care in selecting the housing quarters of the car when a regular or specially planned garage is not provided, will have much to do with the wear and preservation of the finish. Any location adjacent to, or in any way having connection with stabling quarters for horses, may be condemned. The ammonia fumes are destructive to varnish.

This is a season of the year when road dust, mud, or other accumulations, if not washed off at the end of the day's run, suck the remaining measure of oil from the body of varnish, with the result that it loses its reserve resources.

However, at this season do not wash the car with extremely cold water nor in cold quarters. Better slightly warm water and washing quarters from which the cold air has been driven by a gently radiating warmth.

The autumn varnishing of the car, referred to above, is one important means of protection for the color, and the surface beneath the color, which few car owners can afford to neglect in view of the present prevailing high expense of painting the car.

After a long summer of hard service the varnished surface, if examined closely, will be found worn thin, and in many cases worn away altogether, thus exposing the colors, the real splendor and beauty of which are dependent upon the ample protection which the varnish is supposed to give. No such condition as this should be allowed to develop on the surface, and it is one which the car owner ought carefully to guard against.

If the car has been varnished in the spring it will need, in practically every case, a method of treatment which should be proceeded with as follows:

First, a thorough cleaning of all oil, and grease, and crusty accumulations. This cleaning, let it be understood, is the real key to the whole varnishing practice involved. It constitutes the most important step in the entire course of processes necessary to put the car under a new raiment of varnish. In many cases a mild application of caustic soda and water will be needed to loosen up the adamant accumulations of grease and road dust. Waste saturated with turpentine will usually suffice to clean the grease spots from the body surface of the car. In any event, both body and chassis should be clean as a hound's tooth before venturing upon them with color or with varnish. It rarely happens that the surface after being cleaned, and then rubbed uniformly with water and pumice stone flour, as it should be, is in a condition to immediately varnish over without touching up the defective spots with the colors used upon the various parts of the car.

Touching Up Must Be Carefully Done

The minimum amount of touching consistent with the actual requirements of the surface should, however, be adhered to. It matters not how expert a colorist the painter may be, it is never possible to match the old color precisely. And for this reason the touching up should be confined accurately to the bare outlines of the defect. Hit or miss patches of color daubed promiscuously about the surface are forerunners of a splotched and smeary job. While these things are more or less technical in their nature they are at the same time things which the car owner has a right and by necessity ought to know. Such knowledge will assist him to get better results from the local painter, and incidentally it may be the means of saving considerably on the outlay for painting purposes.

At least one good heavy coat of finishing varnish over all the car should be insisted upon. If necessary put a coat of rubbing varnish on the car throughout and then follow with the single coat of finishing varnish.

To Remove Tar from Paintwork

Tar splashes on a nicely varnished body are blemishes not easily removed. Salt butter has been found to be a solvent of tar that does not adversely affect the varnish. Even salt butter will not be a remedy if the tar is allowed to become dry, and a car that has been splashed should certainly not stand overnight without any attempt to remove the splashes. To ordinary fresh butter a certain amount of salt needs to be added. It can be applied by the finger, and, if the butter be rubbed lightly over the offending spot, the tar will be found gradually to disappear. Before the butter is applied, all dust should be removed from the vicinity of the splash, or the varnish will be scratched thereby. A spot of tar not removed will eat right through the paintwork on to the metal panels of the body and become a permanent disfigurement until the body is repainted from the ground work.

Auto-Lite Co. Makes Flywheel Type Starter

Shifter Rod for Sliding Pinion Is Inter-connected with Starting Switch

THIS year the Electric Auto-Lite Co. is marketing a starting motor, Fig. 1, for application to the flywheel of the engine, and this, together with the combined generator and ignition timer, Fig. 2, forms a complete two-unit electrical system. The motor measures 8.75 inches long by 5.5 inches diameter and weighs 36.5 pounds. It is a completely inclosed design having a cylindrical casing 6.3 inches in diameter with two flat sides. The commutator endcover carries the terminals and is standard on all motors. The other cover is made according to the requirements of the engine to be fitted, type of gearing and space available.

Fig. 3 shows a section through an average installation in which a casing containing an internal reduction gear G, and an over-running clutch C is bolted to the end cover of the motor. Keyed to the end of the shaft on which the inner member of the roller clutch is mounted, is the sliding pinion P which meshes with the toothed ring R on the periphery of the flywheel. The

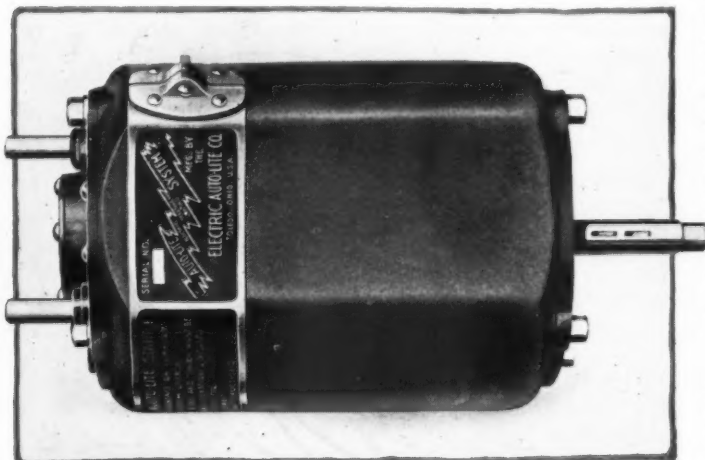


Fig. 1—Latest Auto-Lite starting motor. When arranged for fly-wheel drive a casing containing an internal reduction gear is fitted to the endcover at the right.

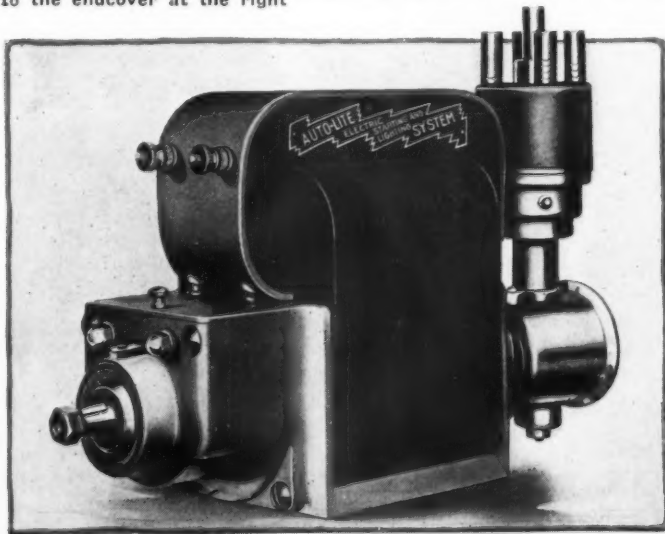


Fig. 2—Auto-Lite combined generator and ignition timer

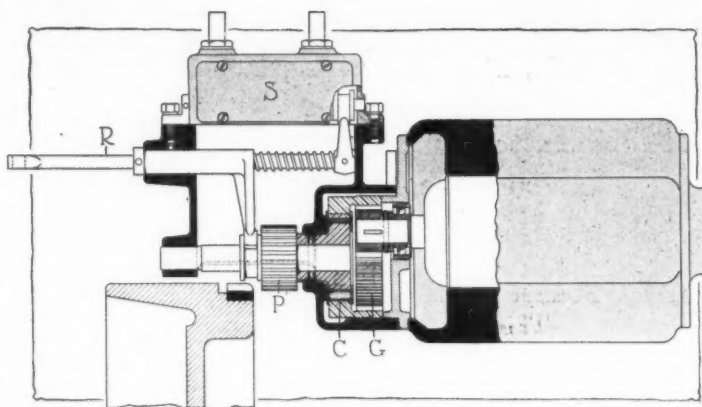


Fig. 3—Showing the application of the starter and the connection of the sliding pinion P to the starting switch S through the shifter rod R

reduction is therefore double. The first step by the internal gear representing a ratio of 2 to 1 and the pinion-flywheel ratio being about 9 to 1, making a total reduction from motor to fly-wheel of about 18 to 1.

Connection of motor to engine for starting is effected by the use of a pedal operating on the pinion through the agency of the shifter rod R. To avoid the complication of two operations and also to eliminate the danger of leaving the motor in the battery circuit, the switch S is so arranged above the starting pinion and connected to the shifter rod that both operations are performed simultaneously. The motor starts as soon as the pinion slides into mesh and is switched off the circuit at the instant of disengagement.

Electrically, the motor does not differ materially from accepted practice. The armature is drum wound and fitted with a commutator of large area. The brush gear is mounted directly on the endcover, Fig. 4, and is readily accessible for inspection purposes or for renewal of the carbons by removing the brass nameplate band surrounding the casing as shown in the outer view, Fig. 1.

The motor is a four-pole series wound machine with two field coils, designed for operation on a 6-volt circuit.

Front End Type Continued

Besides the flywheel model, which represents the latest tendencies in starter design, the Auto-Lite continues the front end type which is easily adapted to existing cars. This design has the great advantage of requiring scarcely any alteration to the car in fitting. The most that is necessary is that the radiator may have to be moved slightly forward. The drive is by chain to the forward end of the crankshaft through a 3-inch over-running clutch. A cast-iron bracket integral with the end cover is the means of bolting down and the motor can be removed as readily as a magneto.

A section through the starting switch for this type is shown in Fig. 4. It is designed for fitting under the floor board with the push rod B projecting for foot operation. The main spring on B returns the contacts C from engagement but a quick break is insured by a secondary spring under the moving contact carrier. Including the gear and all necessary fittings the total front end installation adds about 60 pounds to the automobile.

No alterations have been made in the generator, Fig. 2, this year. The field magnet is made up from laminations and is energized by a single field coil which is inclosed in a brass casing. This coil is compound wound, containing a bucking winding which regulates the generator output on high speeds by reacting on the primary magnetizing force of the main winding. The endcovers and base are die-cast, and totally inclose the generator.

An automatic cutout arranged inside the magnet and above the armature operates when the car reaches a speed of 5 or 6 miles per hour. The maximum output, 14 amperes, is delivered at 1,800 revolutions per minute.

Test 1913 Cadillac On 7-Day Run

English Dealer Tests Car To Decide Whether American Cars Last

LONDON, ENG., Oct. 20.—F. S. Bennett, the head of the Cadillac agency in London, Eng., is giving a striking answer to the question that is often raised in Great Britain as to whether American cars last. The first Cadillac car imported into England arrived in 1903. It was a 6.5-horsepower, single-cylinder central chain drive machine and one of the first tests to which it was submitted was the 8-day reliability trial held in September of that year by the Automobile Club of Great Britain, now the Royal Automobile Club. Learning that the old car was still in service at Slough, about 20 miles from London, where it is used by a chemist in the delivery of medicines in the district, Mr. Bennett hurriedly arranged for the loan of the vehicle and decided to enter it straight away for a repetition of the 1903 trials under the observation of the Royal Automobile Club. It came about that on September 18 Mr. Bennett went to Slough to take over the old single "lunger" just as it was. In such good running order was it that, although somewhat noisy on the run back, the speedometer frequently recorded 20 miles per hour. After a couple of hours spent on it in oiling up, fitting new accumulators—the car has the old battery ignition—and filling up with oil and water, it was locked up for the night. At 6.30 next morning with the driver back of the wheel the car set out for the Crystal Palace, whence at 7.30 a. m., and with the official observer on board, it left for a run of 150.5 miles to Margate, without the tires being changed or pumped up. The subsequent 7-days' run was to various towns on the South Coast and back, the distance ranging from 91 to 144 miles, and each route included a steep hill. Every stop for whatever cause—adjustment or repair—is being duly recorded by the observer.

England's Method of Thief Catching

THEFTS of automobiles have become so numerous in this country and the difficulty of detection is so great that a recent test of the system used in England for the recovery of stolen cars is of great interest. The trial resulted from the discussion of two London automobilists as to the efficacy of the cycle patrol maintained by the Automobile Association and Motor Union. As is probably known, men employed by this association are stationed at frequent intervals on the main avenues of travel, to render whatever assistance they can to passing members. A telephone booth is located somewhere on each man's post to provide means of communication with adjacent patrolmen or with the main office.

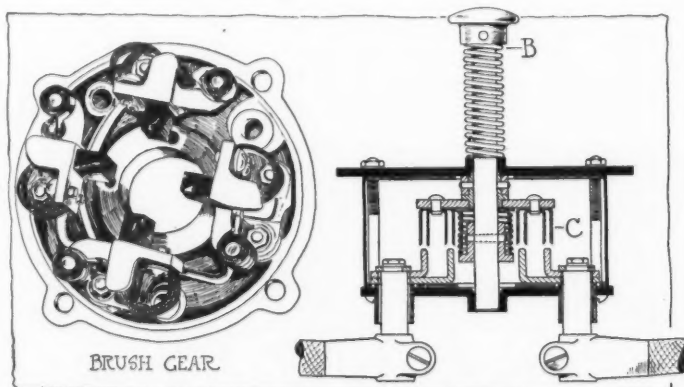


Fig. 4—End cover of Auto-Lite motor and pedal switch

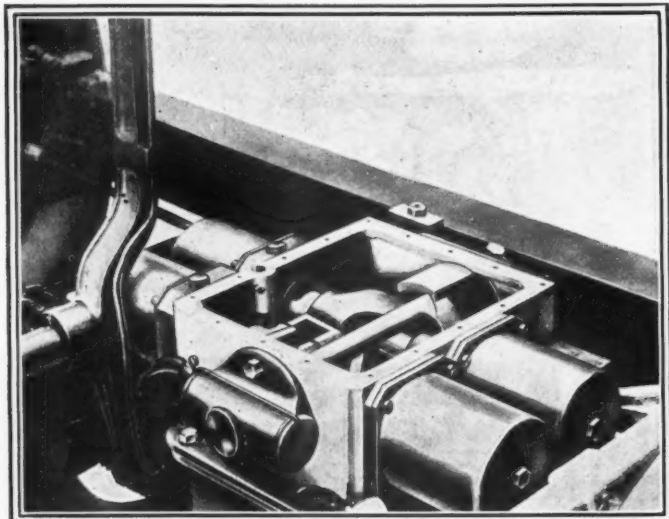


Testing a 10-year-old Cadillac in England



Car thief caught by the A. A. patrols

Among the duties of these men is the recording of the registration numbers of the cars that pass. It was to test this system that a bet of £5 was made between a member of the trade, who held that a car thief would be apprehended in an hour, and a friend. It was agreed that the former steal his own car; so, after leaving one of his visiting cards and a note of the make, color, power and identification numbers of his car with his friend, he started. After waiting long enough to allow the pseudo thief to get well beyond the city limits, his friend reported the loss to the authorities, representing the car as his own. The man in charge made a few notes; two seated, 12 horsepower DeDion Bouton, painted dark green, registered number A-1-BD, stolen from Mansion House yard, and asked the pretended owner to call up in an hour for news. Upon ringing up the office later, he was told that the car had passed the patrols on duty at Putney Hill, Esher, Boxhill and Burford Bridge, but that it had done so before the men on duty had received news that it had been stolen. A little later it was found out that the car had run through Dorking, heading for Guilford. Other reports followed, and eventually one to the effect that the patrol on duty at Clandon Cross Roads, near Guilford, had arrested the driver of the car, who disclaimed unlawful possession, and protested that he was the owner of the car. The circumstances of the theft were then related to the authorities, who immediately released him, and within 4 hours from the time the bet was made he was back in town and had received his money. This little test clearly demonstrated the efficiency of the system.



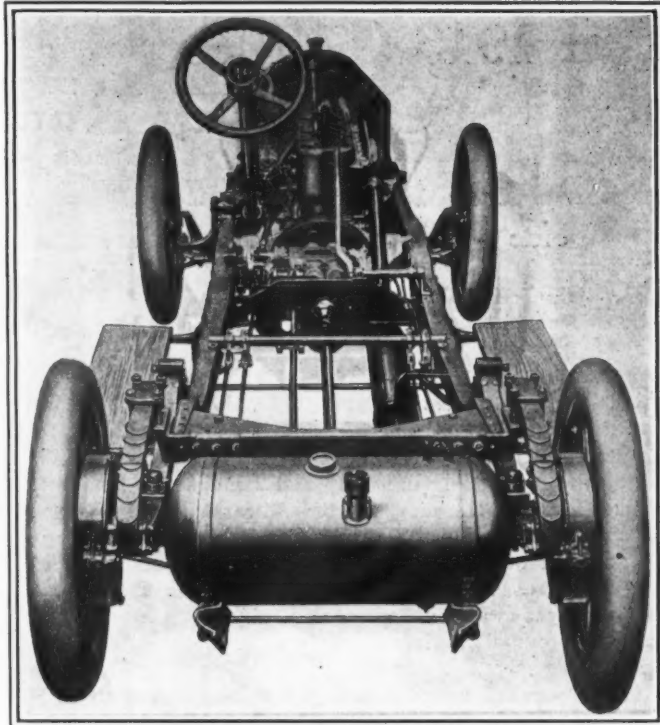
View of electric gear-shifting attachment

Haynes Adopts Electric Gearshift

Two Six-Cylinder Models and One Four Constitute Line for 1914 Season

TWO sixes and a four will be manufactured by the Haynes company during the year of 1914. One important change will be noted in the line for this season. This is the incorporation of the Vulcan electric gearshift on all models. The other changes are of minor importance as the motor and chassis designs are the same throughout. The only new features which stand out with any prominence are the new pressure feed gasoline system which supplants the gravity tank, a power tire pump and body refinements which are in line with the trend of general design.

The three models are known as the 26, 27 and 28. The first two mentioned are the six-cylinder models and these two chassis do not dif-



Rear view of six-cylinder model 26 chassis

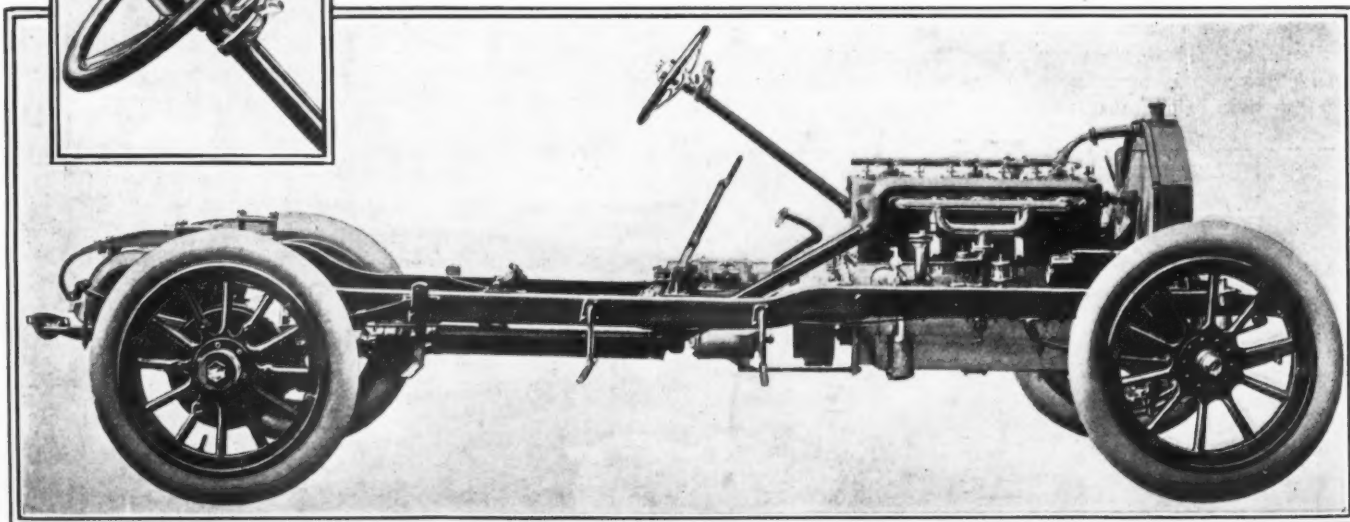
fer from one another except as to wheelbase, model 26 having 130 inches and model 27 having 136 inches. As may be expected, the larger and heavier bodies are found on the longer wheelbase. Model 28, the four-cylinder, has a wheelbase of 118 inches.

The two six-cylinder chassis have motors with a bore of 4.25 inches and a stroke of 5.5 inches, giving an S. A. E. rating of 43.35 horsepower. The calculated horsepower of the motor is 59.6 at 1,500 revolutions per minute, and on dynamometer tests at the factory the makers have secured a maximum of 65 horsepower under full load. The piston displacement is 468 inches and the stroke-bore ratio is 1.29.

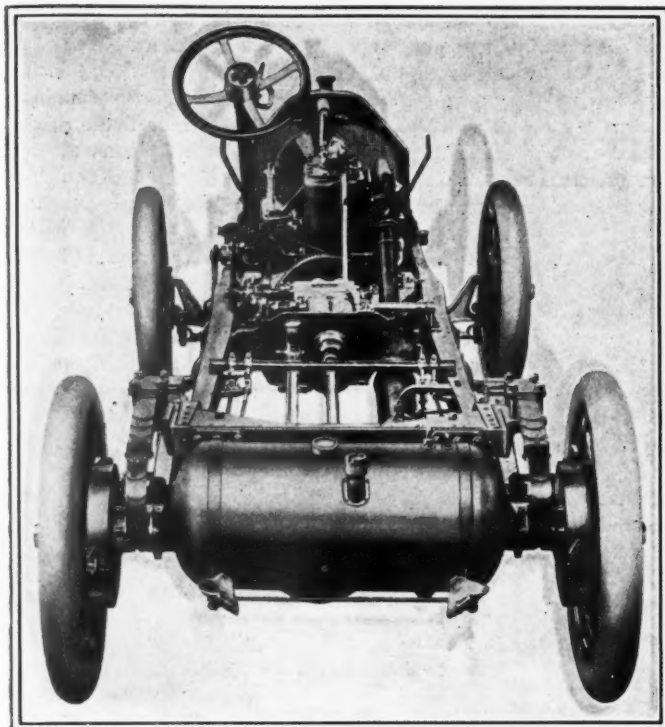
Compression as measured by gauge is 59 pounds and the cylinders are offset a distance of .5 inch to minimize the wall thrust on the explosion stroke.

The material used in the crankshaft is chrome-nickel steel. This member is carried on four main bearings, each of which is lined with Raymonds babbitt bearing metal. The bearings are of the split type.

The piston length is 5.125 inches over all and the piston car-



Side view of model 26 six-cylinder chassis and steering wheel with gearshift control buttons on column



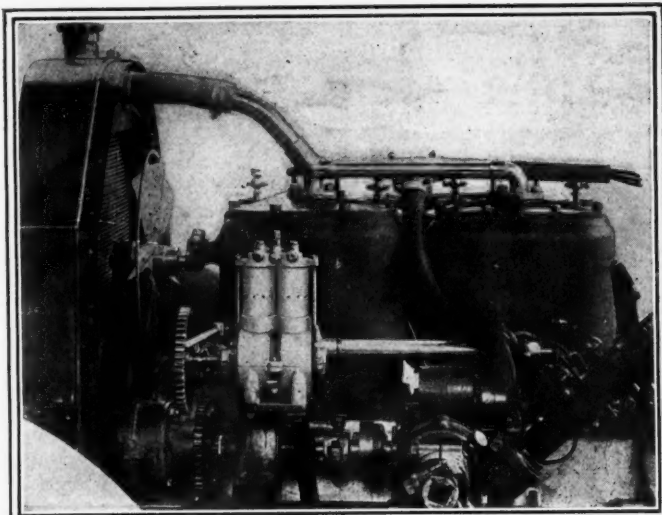
Rear view of model 28 four-cylinder chassis

ries four rings, all located above the wristpin. The space between the center of the wristpin and the top of the piston amounts to 2.5 inches. The width of the rings is .25 inch and they are of the diagonal split, eccentric type.

Forty point heat-treated carbon steel is used in the connecting-rods. They are I-beam in section and are 11 inches long. The wristpin bearing at the upper end of the connecting-rod is 1.125 by 2.8125 inches and the crank bearing at the lower end is 2 by 2.5 inches. The upper bearing carries a bronze bushing while the lower end carries a babbitt one.

The valve system is driven by spiral gears which operate the camshaft. This shaft is carried on four bearings which are bushed with bronze. As the diameter of the camshaft is 1.125 inches throughout its entire length all the camshaft bearings have that diameter while their lengths are 4.75 inches for the front, 4.1875 for the two in the center and 3 inches for that at the rear.

From the cams the valve lift is taken through push rods with mushroom followers that act directly on the cams. The valve



Tire pump and arrangement of its driving gears

lift is .3125 inch. All the valves are interchangeable and are of the 45-degree poppet type. The diameter across the top of the valve port is 1.875 inches and the distance as measured across the lower diameter of the valve port is 1.625; that is, a slope of .25 inch. The valves are all located on the right side and the timing arranged as follows:

Inlet opens—5 degrees past dead center.

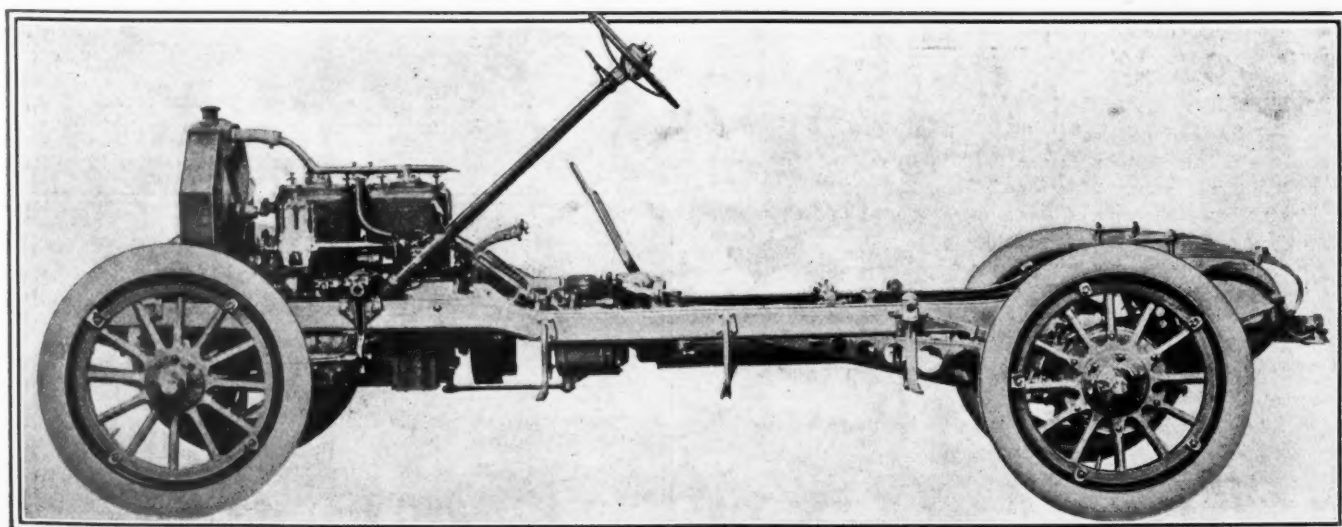
Inlet closes—35 degrees past dead center.

Exhaust opens—48 degrees before dead center.

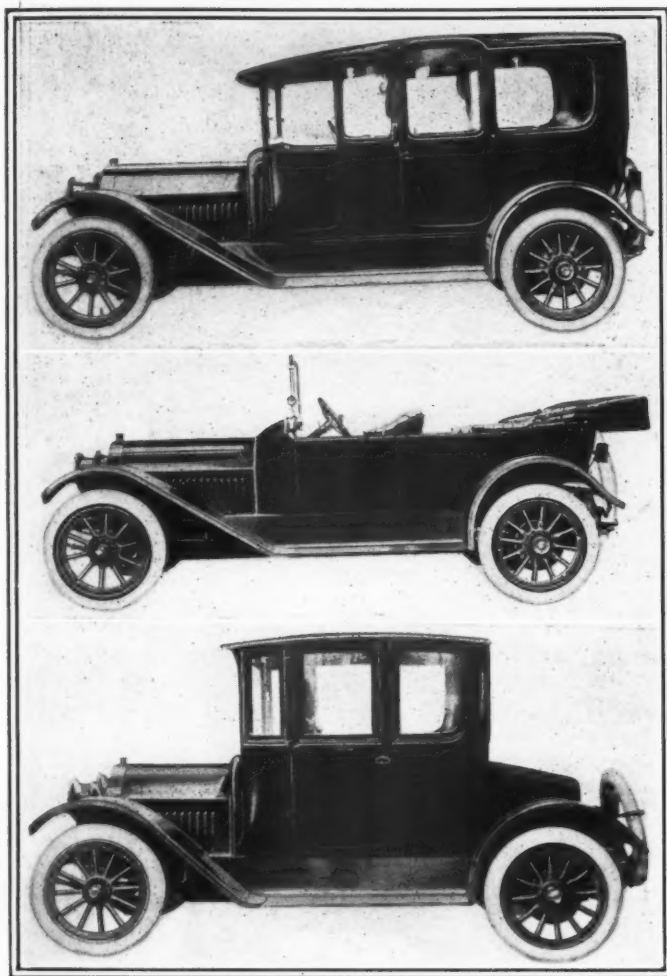
Exhaust closes—3 degrees past dead center.

Firing order—1-4-2-6-3-5.

The crankcase is split into two parts. The line of separation being in the plane of the crankshaft axis. The upper half of the crankcase, which is of aluminum alloy, carries the main crankshaft bearings. The bearing caps are bolted below. The lower half of the crankcase contains the oil reservoir and thus fills the double rôle of a tank and a housing for the rotating motor parts. The capacity of the oil tank is 15 quarts. From the crankcase reservoir the oil is taken by a plunger pump, operated by an eccentric on the camshaft, to a sight feed located on the cowl board. From this elevated point the oil flows with considerable head to the main bearings and timing gears and thence to a series of splash troughs in the lower crankcase just below the crank throws. This system is a combined gravity and splash feed and provides positive lubrication to the main bearings and allows a copious supply to be always present in the



Side view of model 28 four-cylinder chassis, showing torque member and mounting of steering gear



Three 1914 Haynes body type, with tires supported in the rear

troughs from which it is splashed to the cylinder walls and all the other internal motor bearings. The capacity of the oil pump is 1 quart per minute at 950 revolutions per minute of the crankshaft, and in order that the proper amount of lubricant can be gauged for any circumstances, the level of the oil in the crankcase is adjustable.

The electric equipment of the car includes a dual system of ignition and an electric starting and lighting plant. The ignition system is entirely independent of the starting and lighting equipment, even the battery current being supplied by a set of dry cells. Running current is supplied by a Simms high-tension magneto.

Two-Unit Electrical System

The lighting and starting equipment is the Leece-Neville system. Two independent units are used in this system, a motor for cranking and a generator for charging purposes. The storage battery has a capacity of 100 ampere hours and supplies the current for the lamps and for cranking the motor. The speed at which the cranking motor will turn over the engine will vary with weather and other conditions, but under average circumstances, the cranking speed will be closed to 100 revolutions per minute. This is sufficient to secure good carburetion and start the motor. In addition, starting is made certain by a control system at the hand of the driver, whereby a rich mixture is drawn into the cylinders. The generator is cut in to the battery circuit through an automatic cutout located on the dash—at 12 miles an hour and charges at a pressure of 12 volts.

As noted, the gasoline equipment is changed this year and in the place of the gravity system a pressure feed has been installed. The system consists of a 21-gallon tank carried at the rear of the frame, from which the gasoline is forced by a pressure of 2

pounds generated by a mechanical pump which pumps pure air into the tank. The piping from the tank to the carbureter is .3125 inch in diameter and the carbureter size is 1.46875 inch. For starting the flow of gasoline before the motor is running there is a hand pressure pump upon which four or five strokes are sufficient to cause the gasoline to flow from the tank to the carbureter. The carbureter is furnished with a hot air connection which takes the heated air which surrounds the exhaust pipe.

The clutch used this year is the same as has distinguished the Haynes cars in the past. The type is a contracting band. The steel band takes hold of a hardened steel drum. The diameter of the clutch is 10.25 inch and the width of the clutch face is 2 inches. The clutch hub bearing at the axis of the drum is bronze and the thrust bearing is in the form of a bronze ring. The clutch is kept in engagement by a single coil spring.

It is in the gearbox that the most notable change has been made. Mounted in connection with the three-speed gearset is the box containing the new shifting mechanism. A series of solenoid coils replaces the former linkage that transmits the motion of the hand to the gears. There are three forward speeds and one reverse. The reductions through the gearbox are as follows:

- 3.36 to 1 on first.
- 1.57 to 1 on second.
- 1 to 1 or direct on third.
- 4.32 to 1 on reverse.

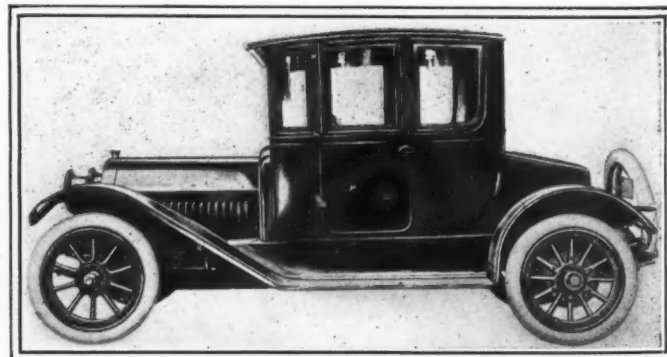
The reduction through to the rear wheels will be the product of each of these reductions by the reduction ratio of the rear axle which is either 3.5 or 3.75 to 1. This represents the total reduction on direct.

Vulcan Electric Gearshift

The Vulcan electric gearshift has been previously described in these pages. Briefly, the system consists in a series of magnets, each one of which serves to engage a definite gear reduction. These magnets are dead until the one desired is brought to life by completing the electric circuit through the wire which surrounds it by pressing the desired button. The buttons are arranged by means of an interlocking device so that it is impossible to have more than one depressed at a time. The action of shifting a gear consists in depressing the button to which that gear applies, and then when the shift is to be made the clutch is simply depressed and allowed to come back in position. Any length of time can ensue between the time that the button is depressed and the shift is made and if the mind is changed in the meantime as to what speed is desired, the other button is pressed and the first springs up. There are five buttons, one for each forward speed, one for reverse and one for neutral. As is shown on page 820, these buttons are arranged in the center of the steering wheel, being fixed on the steering column.

The materials used in the gearbox are chrome-nickel for the main and jackshafts and electric furnace nickel steel for the

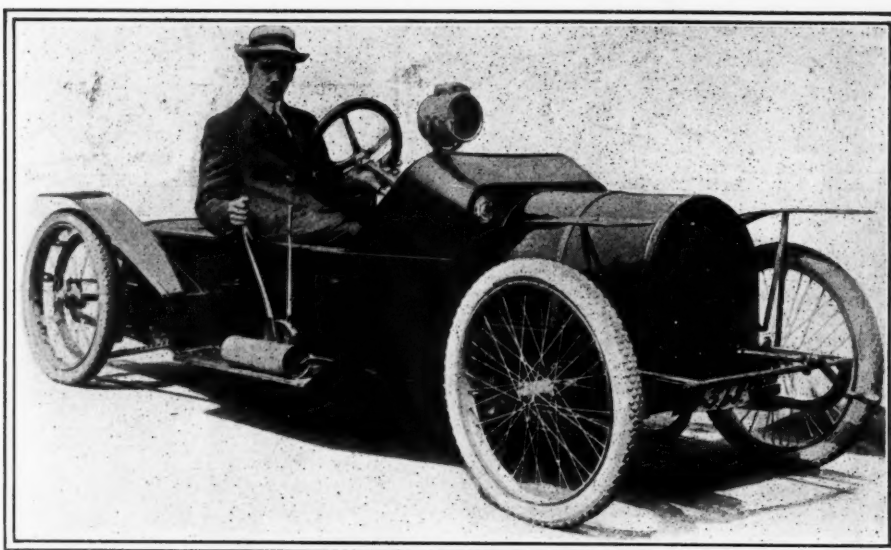
(Continued on page 833.)



Side view of coupe model mounted on six-cylinder chassis

The Cyclecar

Los Angeles Cyclecar Is Made in Two Models, a Two-Cylinder and Four—Both Friction Drive



Side view of the two-cylinder Los Angeles cyclecar

AN interesting new cyclecar which has recently appeared on the market is that put out by the Los Angeles Cyclecar Co., Los Angeles, Cal. It is made in two distinct models, one having a four-cylinder engine and the other a two-cylinder.

Four-Cylinder Has 12 to 15 Horsepower

The four-cylinder model has a 12 to 15-horsepower motor having a bore of 2.5 inches and a stroke of 3.5. According to the A. L. A. M. rating the horsepower developed would be 9. The stroke-bore ratio of 1.4 is sufficient to justify the manufacturer's rating. The motor is of the T-head type with the cylinders cast in block, affording a two-bearing crankshaft.

Power is transmitted by a friction drive allowing four speeds forward and reverse. The final drive is through a double chain to the rear wheels. There is no gearbox and no differential. On the countershaft Hess-Bright ball bearings are used.

Full automobile control is used. The clutch is operated by the customary pedal and the speeds are changed by means of a change speed side lever mounted just outside the body on the right side as shown in the illustration. The emergency brake lever is mounted just outside the change speed lever. The spark and throttle control is on the steering post.

Frame Is of Reinforced Angle Steel

The frame is constructed of angle steel reinforced by hardwood sills and is slung under the axle, being suspended by the springs, thereby giving a full underslung construction. The clearance is 9.75 inches.

The service or foot brake is mounted on the countershaft and the emergency brakes are on the rear wheels. The wheels are the same size front and rear and carry 2.75 by 28-inch tires with an option of 3-inch tires at a slightly different price. The rims are 28-inch single clincher types with double-swaged spokes and knockout axles. The wheels are the wire type and have spokes and hubs specially designed for light car work. These, as may be seen in the illustration, are very much on the order of the bicycle type, excepting, of course, for the heavier construction. The wheelbase of the car is 102 inches, the tread 44 inches and the weight 500 pounds. It is equipped with side light, tail light, horn and full set of tools, consisting of tire repair outfit, wrench, screwdriver and pump. The selling price of the car is \$475 f.o.b. Los Angeles.

Two-Cylinder Model Has 10 Horsepower

The two-cylinder model has a motor which is rated at 10 horsepower, has a bore of 3.375 inches and a stroke of 3.875 inches, giving a piston displacement of 70 cubic inches. This motor is air cooled by a mechanically-operated 12-inch fan. It is lubricated by a mechanical force feed oiler which automatically

distributes the oil through every important bearing surface.

Friction drive is used in this model as in the larger and it has also four speeds forward and reverse. Two 1.25-inch V belts carry the power from the countershaft to the rear axle and the side lever tightens the belts by forcing back the rear axle, thus giving a greater center distance between the rear pulley and the countershaft pulley. No differential is used on this car. The countershaft is mounted on Hess-Bright annular ball bearings.

Emergency Brake Tightens Belt

The control used on this model is practically the same as that used on the four-cylinder, the only difference being in the emergency brake lever which fulfills the double purpose of a belt tightener along with its braking function. Change speed lever is also mounted on the right side, spark and throttle levers on the steering posts, and a brake and a clutch pedal are provided.

Frame is made of angle iron reinforced by hardwood sills and it is carried beneath the axles as in the larger model. In this model the road clearance is 9 inches.

The wheels are the same as in the larger model and the brakes are mounted in the same manner. The wheelbase and tread are also the same, being respectively 102 and 44 inches. The weight of this car is 50 pounds less than that of the four-cylinder type, the machine tipping the scales at 450 pounds. Equipment consists of side lights, tail light, horn, tire repair outfit, screwdriver and pump. The car sells for \$395. The company specifies a mileage of from 35 to 70 per gallon on this car.

Wizard Twin Motor for Cyclecar

INDIANAPOLIS, IND., Oct. 25—For 1914 the Wizard Motor Co., Indianapolis, Ind., is constructing an air-cooled motor for cyclecar use. It is a 45-degree twin, with a bore of 86 millimeters (3 3/8 inches) and a stroke of 98 millimeters (3 7/8 inches). Both valves are set in the cylinder head, and are mechanically operated with long push rods. The pistons are light in construction, with two rings each, and the gudgeon pins are of nickel steel 1 1/16 inch in diameter. The connecting-rods are drop forgings, and that of the rear cylinder is hinged to the lower portion of the front connecting-rod, both rods thus having a common bearing on the single-throw crankshaft. Ignition is by Bosch magneto, with gear drive from the crankshaft. A cooling fan, driven by belt from the inside of the flywheel, is mounted on the crankcase, and a large external flywheel, weighing 20 pounds is provided. A geared-up starting handle is mounted on the motor base. The weight of this motor with full equipment is slightly under 100 pounds and it sells complete with fan, flywheel, and starting device for \$160 f.o.b. Indianapolis.



Quarter plan view of Metropal chassis—a newcomer of solid construction fitted with a motor of 90 horsepower

A 90-Horsepower Car for \$1,350

ONE of the most interesting chassis developments recently put on the market is that incorporated in the Metropal car. Made up in a roadster body, this new addition to the automobile field is guaranteed to make a speed of from 5 to 75 miles an hour on high gear, to have a fuel consumption which averages about 25 miles to the gallon, and to have a motor which develops over 90 brake horsepower. The price of the car is \$1,350.

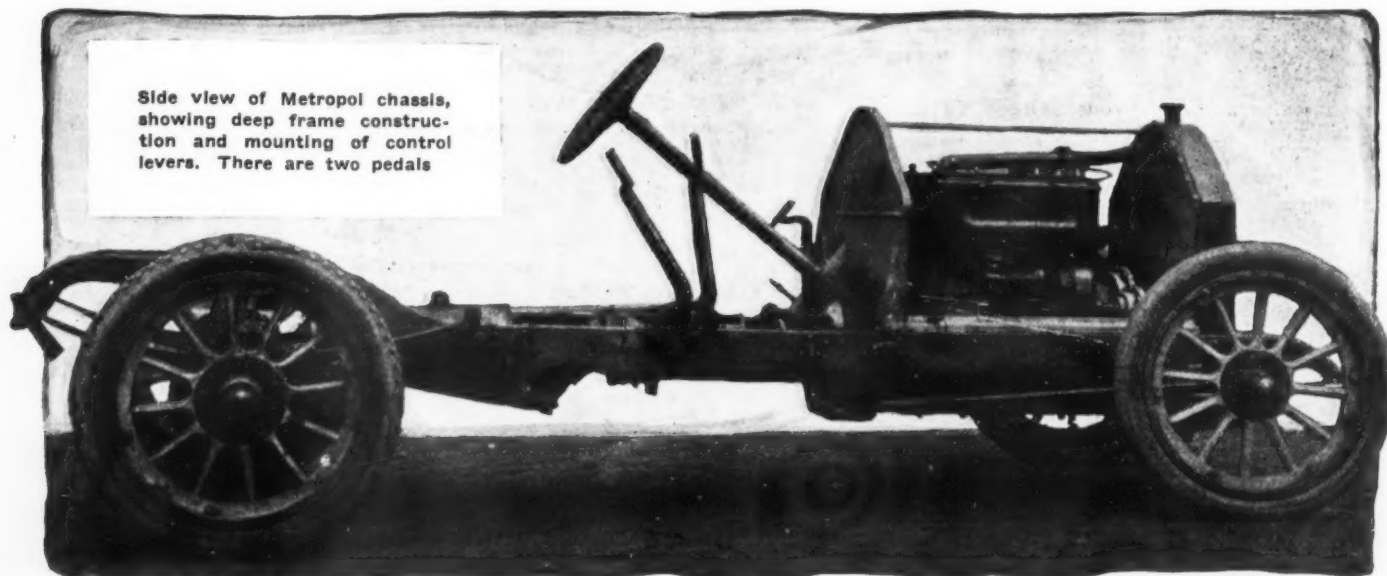
The motor used in this car is a four-cylinder, four-cycle vertical, water-cooled type with T-head cylinders, cast as a block. The bore is 4.25 inches, and the stroke 7.875 inches. The S. A. E. rating of this motor is 29 horsepower, but, due to the long stroke of nearly 8 inches, the makers state that the actual horsepower developed is in excess of 90.

The motor pistons are gray iron castings, of a shape some-

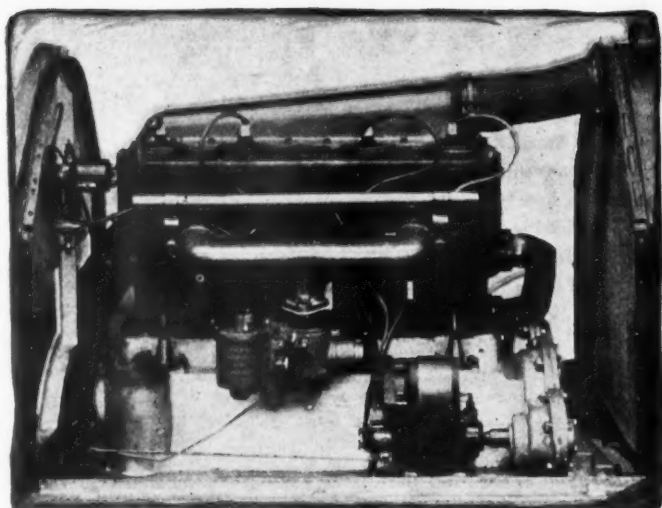
what different from standard design in that the bosses for the wristpin are carried down from the head of the piston instead of the walls, thus making them free from any effects of wall expansion. There are three piston rings, all located above the wristpin. The connecting-rods are of I-beam section. One of the features of the motor worthy of mention is the large valve diameter. This dimension is 2.5 inches.

Lubrication is by a combination force feed and splash system with sight feeds on dash.

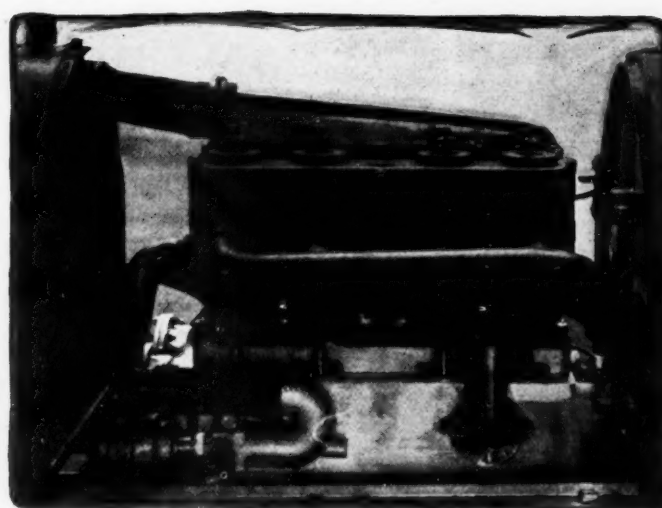
The motor is mounted solidly with the side members of the chassis frame, giving an extremely rigid connection. This solid platform structure is carried back as far as the rear end of the gearbox making a solid unit of the side frame, crankcase and gearbox without any possible change in the relative positions of these parts. The solid structure at this end of the chassis eliminates the universal joint which is generally placed between the clutch and the gearset and removes any chance of racking strains on the crankcase unless they are great enough to work the entire frame and to crush the metal web of the crankcase which connects the motor to the frame.



Side view of Metropal chassis, showing deep frame construction and mounting of control levers. There are two pedals



Carburetor side of engine, showing magneto drive



Note large manifold used in water system

This solid construction, while strong, is light and cheap, because the total number of parts is cut down. The only universal joint in the entire drive is that between the gearbox and the rear axle, this being necessary to take care of the changes effected by different loads. The car is designed to afford a straight-line drive when carrying the normal load, that is, the driveshaft will be horizontal.

The gearset is sliding selective and furnishes three forward speeds and one reverse. The gears are of hardened high-carbon steel, and the shafts are carried on R. I. V. ball bearings. The gearbox is aluminum and is held rigidly in place by being firmly bolted to a cross-member passing across the frame at the rear of the gearbox. Two heavy lugs hold the front end of the gearbox to the frame. The structure built up from the front end of the motor back to the rear of the gearbox gives virtually a unit power plant. Everything within this space is held solidly in alignment and there is no relative motion of any of the parts. The gear ratio on high is 2.5 to 1.

Cross-Brace Holds Gearset

The cross-brace which passes across the motor frame at the center of the car and holds the gearbox is the only subframe in the car. The part is a steel forging of deep section forming a sort of bulkhead across the structure. It is connected to the frame through a solid gusset plate and performs the functions of closing the solid structure at the front of the car and furnishing the support through which the drive of the car is taken, as the housing of the driveshaft is connected to it.

Back of the forging just described and connected flexibly to it is a heavy yoke carrying the axle housing, which fulfills the duties of a torque rod and radius rods. The yoke is free to move only in a vertical direction and accommodates itself to the different positions of the rear axle in moving over uneven ground. The yoke is in the form of a fork, the overall spread of the horns being 16 inches and the maximum length 15 inches. The connection through the ends of the fork to the cross-member is by means of lugs through which pass hardened steel pins. The pins form pivots, allowing the fork to swing in a vertical arc. At the center of the fork where the prongs join is the part carrying the bearing which carries the driveshaft and also connects the yoke to the axle housing. The connection of the yoke to the axle housing is arranged in such a manner that the shaft housing can rotate in case one wheel is higher than the other.

Owing to the fact that the gearbox is mounted relatively far back, in the length of the car the driveshaft is only about 4 feet in length. When the designed load is in the car this shaft lies exactly horizontal, thus giving a straight drive from the crankshaft of the motor through the single Spicer universal joint to the rear axle.

The drive is taken through bevel pinion and gears to the differential and floating rear axle. The reduction through the drive to the rear axle is 2.5 to one. This represents the gear reduction on high gear as the car is geared direct on third. The rear axle and differential are carried on R. I. V. ball bearings of ample dimensions.

The frame construction, which has been touched upon in connection with the description of the solid assembly of the front end of the chassis, is deep and rigid. At the heaviest part the side channels are 5 inches in depth and have a flange width of 2.5 inches. The depth tapers in relation to the distribution of strains and the flange width becomes 1.5 inches at the narrowest part. There is a rise of 8 inches in the rear of the frame and the front of the frame is toed in to secure a narrower turning radius. The thickness of the carbon steel used in the framework is 5-32 inch.

There are two sets of brakes, the foot or service brake is operated by a pedal located at the right of the clutch pedal. The emergency brakes, however, are operated by a lever mounted on the right side of the car outside of the gear-shifter lever. The two sets of brakes operate on the same drum, but not on the same part of it. Both brakes are internal expanding and the single drum covers both these brakes. The drum is 14 inches in diameter and 4 inches wide, giving a drum width of 2 inches for each brake.

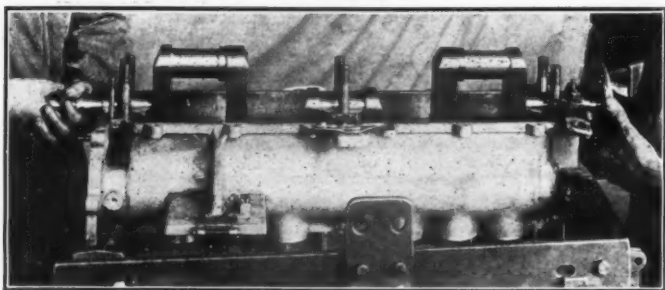
The semi-elliptic front springs are 2 inches in width and 36 inches long. The rear springs are also semi-elliptics and are 2 inches wide and 48 inches long. The front springs are practically flat and the rear springs are also designed to assume a flat position when the load of passengers, gasoline, extra tire, etc., is upon them. The upper shackle bolt of the rear spring extends all the way across the rear of the frame of the car and forms a cross-member at this point.

Low Center of Gravity

Artillery wood wheels are used. Both front and rear are fitted for 33 by 4-inch tires. The wheels have twelve spokes and are all equipped with Stanweld demountable rims. The wheels are also fitted with the R. I. V. ball bearings.

The wheelbase of the car is 115 inches and the tread is 56 inches. The center of gravity of the car is low, being in the plane of the wheel hubs. Clearance of the car above the ground is 10.5 inches at the lowest point.

Right steering and control are used. The steering wheel is 18 inches in diameter and the spark and throttle controls are mounted on top of the column in the regular manner. The gasoline capacity of the tank is 20 gallons and in the speedster body it is mounted behind the seats. The roadster weighs 2,500 pounds.



The Rostrum

Proper Posting of Detours Often Neglected

EDITOR THE AUTOMOBILE:—If there is anything that the voice of protest should be raised against it is the manner in which many of the New Jersey repair detours are posted, or rather not posted. There are sections of road in repair all over the state and many times the tourist finds himself confronted with a section of fence and a pair of red flags or lanterns in the foreground and a long stretch of broken stone in the background. In an enlightened community there would be a sign on that fence telling the driver to detour to the left or right and when he came to the next road the detour sign would guide him properly until he again found himself on the main road beyond the repaired stretch.

Instead of having the signs as outlined above, the only sign that appears is one which blandly states "Road closed." Now any fool can see that the road is not passable in practically every case, and if it is a manner of sign economy it would only be necessary to omit the Road Closed sign and substitute one which said, "Turn Left" or "Turn Right."

It is generally possible to work road repairs in such a way that a detour is provided. If the repair is started at two intersecting roads and carried to the next road intersection there is always a way through. This method is generally pursued

and the only thing that remains is to instruct the driver how to get around the closed part. It very often happens that if the driver turns right it will not be possible for him to get back on the main road for many miles, whereas perhaps a few hundred yards to the left there will be a road that runs in the right direction.

An instance where it is impossible to get through to the right and a road is located one block away on the left may be noted on the road between Leonia and Hackensack, N. J. This is a road taken by practically every New York automobilist who does any touring at all, and it is taken by automobilists from not only New Jersey but all over the country on their way to New York City. This is not the only example but it will serve to show the effect of neglecting to post this spot as I recently saw a large six-cylinder, seven-passenger touring car stalled in a washed-out road because it turned to the right instead of one block to the left at this point. I hope you will publish this as an expression of protest on the part of a representative motorist who speaks for adequate posting of roads, especially detours, all over the country as a service which the automobilist may rightfully expect.

Englewood, N. J.

H. LOWE.

Reader States That He Believes That Dampness Affects Motor

EDITOR THE AUTOMOBILE:—I wish to heartily endorse the views of F. R., in THE AUTOMOBILE for September 11, also those of J. E. S. in the issue of September 25, on effects of dampness.

The first time I noticed any difference in the work of the motor was on an afternoon recently when I left Boston at 4 p. m., for a 50-mile drive. When about 12 miles out my coil went wrong and I had to drive on one cylinder with the attendant troubles until late at night. After sunset the cool night air took effect and the motor began to work better. By the time I reached home at midnight, that one cylinder was doing almost as good work as any single motor.

Every day I drive about 4 miles to and from my work and when going home late at night I climb a grade of 90 feet to the mile and I can get up the steepest part on high where I have to drop one notch in the daytime.

This is not an unusual instance but a common thing in my daily drives.

Westminster, Mass.

F. C. B.

—The Editor of the Rostrum would like to hear from automobilists who have experimented with water injection into the intake manifold. The fact that dampness improves the running qualities of a motor indicates the possibility of an owner increasing his mileage.

In THE AUTOMOBILE for October 23 two schemes were shown of methods by which automobile users could fit water tanks to their cars in order to allow the motor to suck in a supply of water along with the gasoline. One user mentions an increase in mileage of 20 per cent.

Wants Information on Light Metals Known As McAdamite and Magnalium

EDITOR THE AUTOMOBILE:—I would like to have some information in regard to the new light metals, McAdamite and magnalium, being used for automobile engine pistons.

I would like to have the addresses of the parties who manufacture the pistons or metal and where it could be obtained.

I would also like to get all the information I can in regard to the use of the metal.

Detroit, Mich.

W. J. LA TOURRETTE.

—Both these metals are aluminum alloys. They are designed to furnish a light metal to be used where light castings are needed and in parts in which the peculiarities of aluminum in combination with alloys are a success.

Magnalium is manufactured and sold by G. A. Crayen & Co., 81 New street, New York City. McAdamite is handled by the U. S. McAdamite Metal Co., Detroit, Mich.

Magnalium is a combination of magnesium and aluminum. The makers claim for it good quality as a bearing material and hence a satisfactory piston material. It is also used in all light work where a metal of 23,000 pounds tensile strength of ductile qualities are satisfactory. When made up in piston form for experimental purposes on a standard 48-horsepower motor of well-known make the magnalium piston weighed 1.75 pounds, the iron piston 4.75 pounds and a steel piston 2.75 pounds. On a test of this same motor it is stated that when using the iron piston at 1,600 revolutions the maximum power was reached, this being equal to 67.5 horsepower. At this motor speed 73 horsepower was developed with the magnalium piston showing an increase of about 15 per cent. The maximum power with the magnalium pistons was reached at 2,200 revolutions per minute and was

equal to 84. The power at 1,870 revolutions was respectively for the magnalium and iron piston, 81 and 60, a gain of 22.7 per cent. for the magnalium.

McAdamite has a higher tensile strength than the magnalium, giving about 35,000 pounds to the square inch. No tests regarding its success as a substitute for iron to lighten the weight of the reciprocating parts of a motor are recorded, but if experiments have been conducted along this line full information regarding them can be secured from the makers at the addresses given above. There are many fields for metals of this type and space does not permit a full discussion of both. However, the above facts are an outline of the purpose of the metals and further information can be secured from the manufacturers.

Moisture To Increase Power

Editor THE AUTOMOBILE:—I—I see mentioned the question of moisture in the atmosphere adding to the pulling power of an automobile. It does seem to me that a car works better on a foggy day and at night than at other times. I should think it is because there is more oxygen given to the carbureter. I am inclined to think that the moisture helps.

2—Will you please tell me if a car would run on pure acetylene gas from carbide?

Madison, Ga.

A. K. B.

—1—From the experiences related often before in these columns there can be no doubt that the effect on the motor of moisture in the air has attracted the attention even of the casual observer. The experienced driver knows the "feel" of his car, so well that it cannot be a mere mental delusion which causes him to think that his motor has more power when the air is misty as in a fog.

The test related by one reader in which he states how his car climbed a hill on high gear when running through damp air and how it failed to climb the hill on high on a dry day must be convincing, even to the most skeptical.

When water is admitted to the cylinder in small quantities in such a finely-divided state that it is immediately transformed into steam under the influence of the high temperature of combustion in the cylinder, the oxygen goes to combine with the carbon in the fuel, forming carbon dioxide, a healthy exhaust product. The hydrogen, of which there are two parts to each part of oxygen in the steam, is a highly inflammable gas and in fact produces more heat units during combustion than carbon does for equal weights. This hydrogen content adds a great deal of power to the explosion.

There is a limit to the amount of water which can be successfully admitted to the cylinders. This limit is imposed by two factors, first, the cooling influence due to the heat consumed in raising the water to the boiling point and second the amount of steam which can successfully be broken down by the glowing carbon in the short time allowed by the working stroke of the motor.

2—The motor would run on pure acetylene, provided there was enough air supplied to support the combustion of the gas. In fact, it has been very successfully used in bringing home motorists who have run out of gasoline, the leads from the headlights being connected to the carbureter intake and the motor operated on the acetylene gas. Acetylene starting, which has been used with great success during the past few years, consists in nothing more than the explosion of a charge of acetylene gas in the cylinder on the working stroke.

Wiring of an Automatic Cut-out

Editor THE AUTOMOBILE:—Please show me in THE AUTOMOBILE the way an automatic cut-out is wired and how it works and the size wire with which it is wound.

Pittston, Pa.

R. M. S.

—The automatic cut-out has for its purpose the cutting out of the connection between the battery and generator when current starts to flow from the battery to the generator or when the pressure between the generator and the battery drops so low that

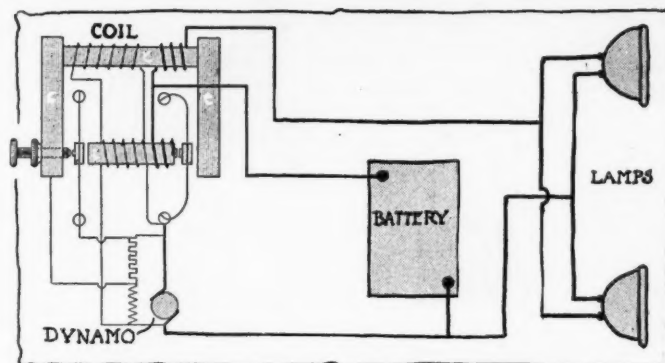


Fig. 1—Wiring of automatic cutout and current regulator combined

there is danger of a flow in a reverse direction taking place. For this reason it is generally known as a reverse current cut-out.

There are several ways of winding the reverse current cut-out, but they are all minor deviations from the principle shown in Fig. 2.

As a study of the illustration will show, the principle utilized is that of the magnetism of a core surrounded by a primary winding through which a current of low voltage passes. In the majority of cases the voltage used is 6, in automobile work. When current starts to flow from the generator owing to the fact that the engine speed is such that it produces a corresponding armature speed sufficient to cause a flow of electric current, it passes through the winding surrounding the soft iron core. When the current is sufficient to magnetize the soft iron core, a contact piece is magnetically drawn against the core, thereby closing the circuit between the generator and the battery. When this circuit is closed the generator charges the battery and continues to do so until the electromotive force between the generator and battery drops to such a point that the current passing through the primary winding falls so low that the magnetic force of the core is no longer sufficient to hold the contact piece against it. The circuit is then broken and is remade when the magnetism again overcomes the tension in the spring. The size wire you use will depend on the speed at which you wish the contact to be made and broken, upon the quality of the iron core, the tension in the spring of the contact piece and the size and capacity of the generator. If you are making one of these yourself you could use the core and winding from a cheap coil and you could reduce the number of windings on the coil or increase them to suit your needs and to compensate with the tension on the spring of the breaker.

This is the bare principle upon which this device operates and in the refined devices found on the lighting systems now in use, there are many details which are peculiar to the type upon which they are found. Certain systems, for instance, are so arranged that the generator cuts in at one speed and cuts out at another. This prevents the battery contact from continually making and breaking when a car is traveling at the cut-out speed. Very

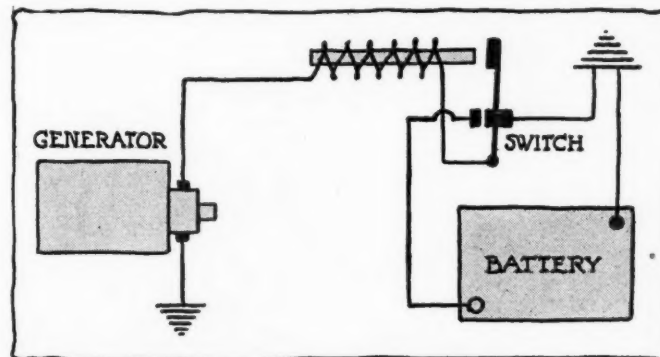


Fig. 2—Diagram explaining the principle of a cutout

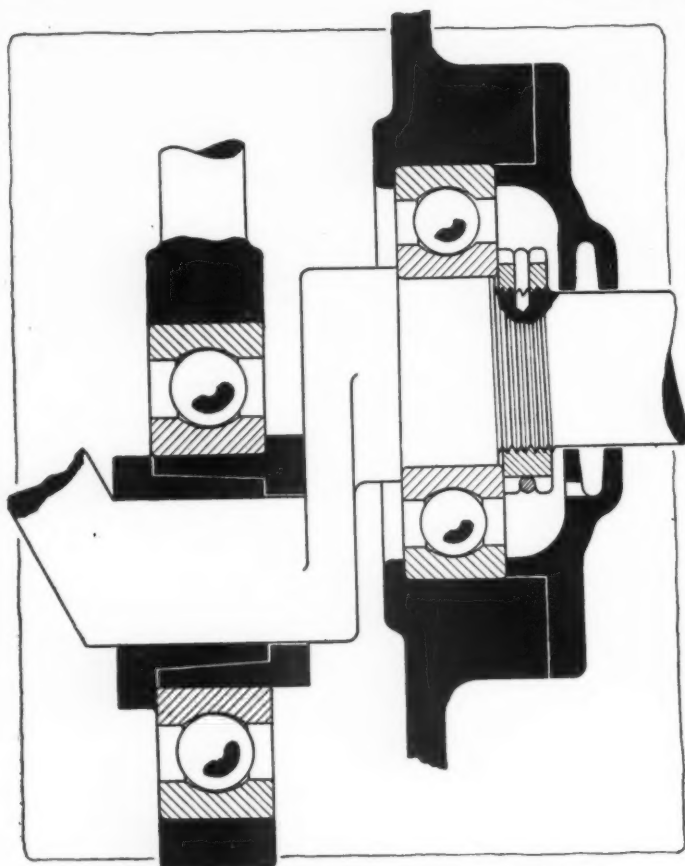


Fig. 3—mounting of a ball bearing crankshaft

often the cut-out and the current regulator are combined in one housing and the wiring is very neatly arranged to take care of this double duty. Such a wiring scheme was shown in *THE AUTOMOBILE* for October 9 and is repeated in Fig. 2. The soft iron core can be either in one piece or may be made up of a bundle of heavy iron wires wrapped together. The latter type is good on account of the rapid change possible in the magnetic action.

Autocar Spur-Bevel Drive Shown

Editor *THE AUTOMOBILE*:—I have in my garage an Autocar commercial upon which I have to do some work. This car uses what is called the spur-bevel drive and I would like the mechanism explained. Would you kindly explain the assembly to me in

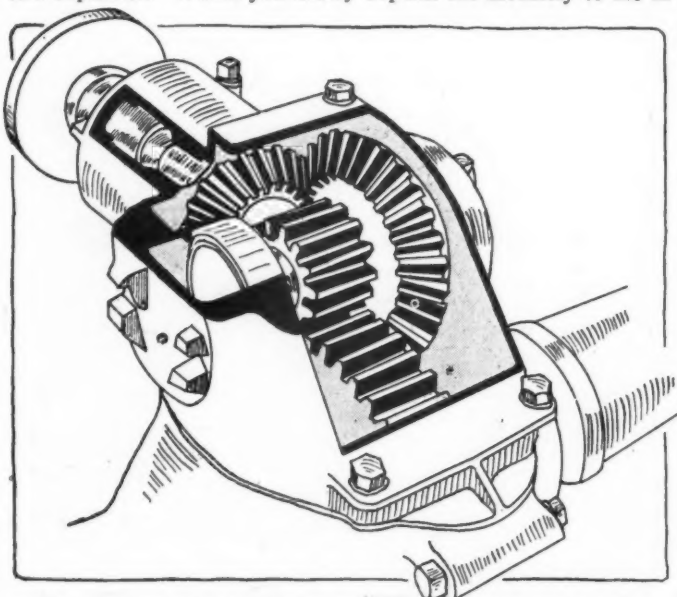


Fig. 4—View of the Autocar combined spur and bevel drive

order that I can work in the right direction on this repair job.
New York City.

NORMAL GARAGE.

—The rear mechanism of the Autocar combines the spur and bevel gears in a manner which has been called a spur-bevel drive. On the end of the driveshaft is a bevel pinion which meshes with a large bevel gear in the customary manner. Rotating on the same axis as this large bevel gear, this combination is known as the jackshaft bevel gear and spur pinion. It is mounted transversely across the upper drive gear case which is mounted just ahead of the differential. The drive is carried back from the transversely mounted spur gear to the spur driving gear of the differential. The spur driving gear is assembled with the differential. The spur driving gear is riveted to the differential case. The differential cross is carried in the differential case and upon the four arms of this cross are mounted bevel pinions meshing with the bevel gears. The gears are carried in the differential case by means of a bushing and the hole through the gears is broached to fit the inner end of the driving axle. To remove the differential gear from the axle it is necessary to remove the axle from the car and take down the housing. The differential can then be taken apart by removing the bolts. To remove the spur gear which takes the drive from the spur gear attached to the pinion it is necessary to cut the rivets which hold it to the differential case. If it is desired to remove the upper drive from the axle, this can be done by disconnecting the rear universal flange and the nuts from the studs in the rear axle housing, after which the gear case can be lifted off the rear axle housing through the trap door provided in the floor of the body.

Effect of Carbon in Iron

Editor *THE AUTOMOBILE*:—In an issue of *THE AUTOMOBILE* a year or so ago a curve was given which showed the tenacity, relative hardness and relative ductility for different percentages of Ferrite and Fe_3C . I have lost this issue and inquiries have resulted in my learning that this issue must be out of print. Would it be possible to have this curve reproduced?

Syracuse, N. Y.

GEORGE DEWEY.

—The curve you speak of is no doubt that given in Fig. 5. The percentages of Ferrite and Fe_3C are given on the scale at the bottom of the curves and the corresponding percentages of carbon in these different contents are shown on the scale at the top of the illustration. The relative ductility and the relative hardness are read on the percentage scale to the right of the illustration. On the left side of the chart is shown the scale of tensile strengths, which, of course, refers to the curve of tenacity. This curve of tenacity is remarkable for its too sudden changes of slope. Up to a percentage of 0.9 carbon the increase in tenacity is rapid. After this point while there is still an increase the slope is more gradual. When 1.2 per cent. is reached the tenacity drops quickly on about the same minor slope that it had on its way up in the lower carbon percentages.

Adjusting Overland Steering Gear

Editor *THE AUTOMOBILE*:—Considerable play has developed in the steering gear of my 1-year-old Overland 69 car. I traced the play and note that it is at the point where the worm engages with the little gear wheel that operates the arm with a ball and socket joint on the end. Is it possible to make the repair or adjustment myself without taking the car to a garage?

Mt. Vernon, N. Y.

P. C. E.

—There are two places where the play can be taken up on the Overland steering gear. The sector is carried on an eccentric bushing, which, when turned, moves the sector closer into engagement with the worm. Referring to Fig. 4, this eccentric bushing is shown. In making the adjustment first jack up the front wheels by placing the jack beneath the center of the front axles so that both front wheels are lifted from the ground. This will let the steering gear turn freely and will enable you to determine any looseness. Loosen the three clamping bolts shown in the illustration and turn the slotted adjusted

nut down until the play is out of the wheel. Turn the steering wheel over until the wheels are as far to one side as they will go and turn the eccentric bushing. This will take up the wear on the small gear, allowing it to mesh more closely with the worm. After a time this adjustment will no longer be of any use when the gear has been worn to a considerable extent, but this will not be until after you have made several adjustments. When the gear does become worn, take off the ball arm by removing the clamping bolt which holds it and then turn the steering wheel completely around for one and a half revolutions. This will present a new surface. After the ball arm has been replaced make the adjustments as before, being sure to tighten all the nuts after finishing the job.

Full Ball-Bearing Crankshaft

Editor THE AUTOMOBILE:—Are there any crankshafts which not only rotate on ball bearings but which use ball bearings at the cranks; that is, in which the bearings at the lower ends of the connecting-rods are also of the ball type? If bearings of this kind are used would you kindly show enough of the crankshaft to illustrate one of the bearings at the bottom of one of the connecting-rods and one of the main bearings.

Paducah, Ky.

B. C. M.

—Installations of the kind you mention are common and the chief advantage claimed for them is the greatly reduced length of crankshaft owing to the fact that the ball bearings require less length than a corresponding plain main bearing. The end main ball bearing and the first bottom connecting-rod bearing in a foreign installation are shown in Fig. 3.

Winton Changes in 1910

Editor THE AUTOMOBILE:—I—In what year did the Winton company introduce the four-speed gearset?

2—What other changes were made in the car for that year?

3—What changes were made in the price of the car for that season?

New York City.

WINTON OWNER.

—I—The 1910 Winton was the first car of that make to have the four-speed gearset.

2 and 3—Quoting from an article which appeared in THE AUTOMOBILE for July 8, 1909, the features of the 1910 Winton were as follows:

Winton changes for 1910 are only incidental, not radical, barring the four-speed gearbox and enlarged clutch. It has been found in the experience of the past and previous years that the engine was more powerful and had more speed than the high speed of the old gearbox would allow. So a new top gear has been added to allow the owner, if he so desires, to turn the engine loose with the assurance that every possible turn of the crankshaft will be utilized in the speed of the car. Coupled with this change, there was a necessity for a larger clutch than heretofore, which would handle the higher power and speed. So the diameter of the multiple disk clutch was enlarged 50 per cent. without changing the number of the disks. A minor change was in the number of springs, the newer use of four allowing very slight foot pressure to engage or disengage the clutch.

While the motor remains exactly the same, superior fuel supply is attained by a newly-perfected carbureter, located in practically the same place. This allows the full use of the flexibility of the six more than has hitherto been possible. The working parts are more closely inclosed, yet this is done without any sacrifice of accessibility.

Lubrication is unchanged, the force feed system with a continuous sight feed on the dash being retained. Similarly the successful self-starting device is retained. Now that much accent is being laid upon the starting problem, this is of particular importance. Pressure from the front cylinder is stored in a tank, whence a rotary distributing valve furnishes it to the proper cylinders in turn. The motor is started by pressing a foot button on the dash, the air pressure doing the rest. This whole system may be used for tire inflation by a simple attachment, thus doing away with the back-breaking work. An item that never fails to interest is that of comfort. An increase in this is obtained by increasing the length of the springs, the style being the same as before. In addition to long, wide springs, four shock absorbers and four rubber bumpers are fitted.

One noticeable change, which may or may not be in the nature of an experiment, is the change in the material of the front axle.

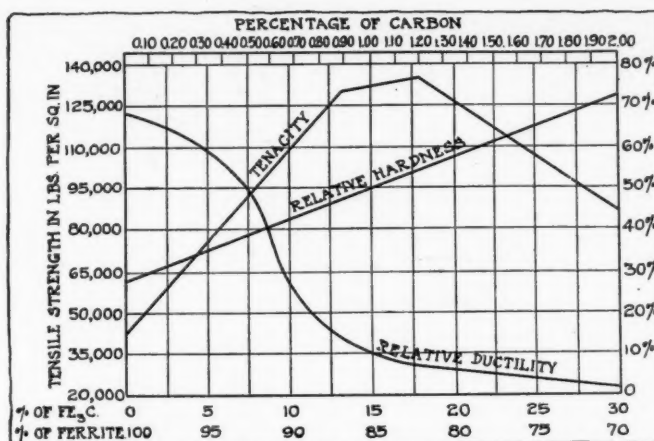


Fig. 5—Curve showing effect of different carbon percentages

This has always been made of manganese bronze, but this coming year it is to be of large section pressed steel. With the change in front axle, probably strengthening it, comes an increase in the wheel base. This has been increased to 124 inches, four more than previously.

To this chassis of greater length is fitted not a longer but a shorter body. In this way the maximum amount of comfort is obtained, as the various dimensions may be made as long or as great as possible. The regular body is the four or five passenger type, with bucket seats in front and a short tonneau in the rear. A seven-passenger body is made as an extra. The new tonneau doors are unusually wide. Running boards have been widened and are covered with pressed aluminum. All bodies are of wood, built especially to Winton designs.

In moving the main gasoline tank to the rear, a move for greater safety and increased convenience has been made.

Other and minor features which have been subjected to change are: radiator with longer tubes, longer filler and hard rubber cap; hard rubber steering wheel rim, movement of operating levers nearer the seat as an option, longer spark and throttle levers, increased pedal leverage, with the option of long or short pedals; larger exhaust pipe and Eisenmann dual ignition. With all these changes the price remains the same—\$3,000.

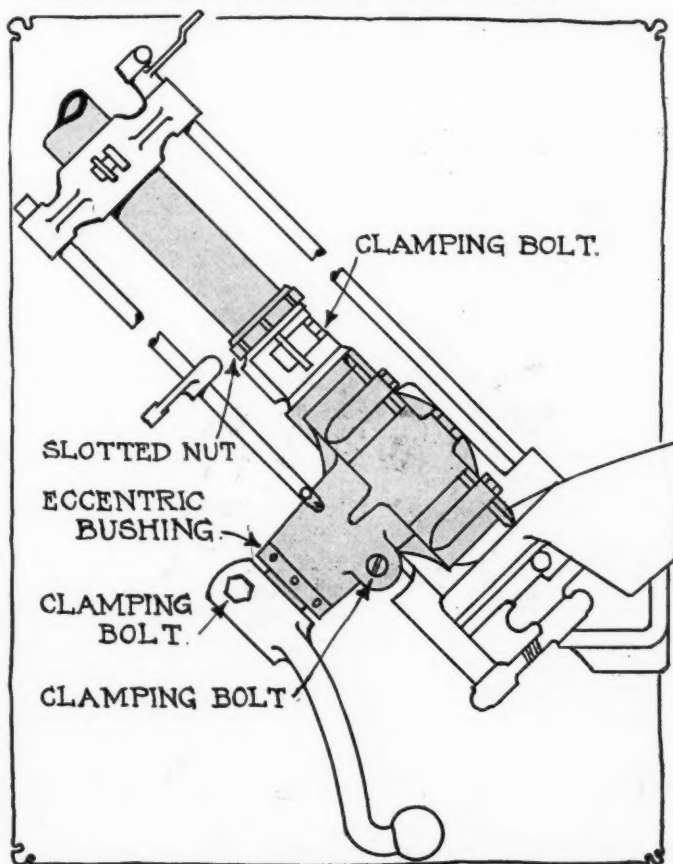


Fig. 6—Adjustments on the Overland steering gear



The Engineering Digest



Pioneer Makers of High-Speed Motors Bring Out New Features in Three 1914 Model Cars

Convinced that Location of Camshaft Close to Valves Represents Only Practicable Method for Making Automobile Motors of Poppet Valve Type Operate Silently and Reliably at Very High Speeds, a Leading Apostle of Specific Efficiency at Any Cost Works Out Interesting Solution of Difficulties

THREE new models of Hispano-Suiza cars, designed by Birkigt, present a number of characteristics exemplifying the most radical trend in the evolution of motors of very high speed for every-day automobile work. The motors are of the following dimensions: one 80 by 130, another 90 by 150 and the third 100 by 180, but they are practically identical in general design. All are of the four-cylinder type with block castings, thermo-siphon water-cooling, hemispherical combustion chambers, the camshaft above the cylinders actuating rocker arms to the short valve stems.

Various means have been tried to make valves close and open with definite movements and complete closures in spite of a motor speed of 3,000 revolutions per minute or higher, especially increased strength of valve springs (which wears out cams and rollers too fast) and special cam profiles, but only the utmost reduction of the weight of all moving parts of the valve mechanism has been found effective. The overhead camshaft with its elimination of tappet rods is in this respect supreme and is therefore in this case the expedient adopted, while the dimensions are the normal ones required for strength and rigidity. The play between the rollers of the rocker arms and the ends of the valve stems can be adjusted by means of interposed steel washers, each about 1/10 of 1 millimeter thick. The exhaust is opened about 30 degrees before low center.

Silence Through Rigidity

The motors are said to operate as silently as any of much smaller specific efficiency, and this result is attained by a thorough avoidance of flexions and vibrations. The crankshaft, for example, is supported in four bearings instead of the usual three, and of these bearings two are located at the ends, one between the first and the second cylinders and another between the third and the fourth cylinders. As compared with five bearings this arrangement has the advantage of shortening up the motor and rendering casting of the cylinders in block practicable, while in comparison with three bearings, one of them central, the gain in rigidity is direct.

At the middle of the front end bearing there is mounted the helicoid gear from which, by means of a vertical shaft and other helicoid gears, the camshaft is driven. This drive is thus supported on both sides, obviating vibrations and sound, and the vertical shaft turns in a perforated bushing contained in a turret formed of two parts, one of which is cast with the cylinders and the other with the crankcase.

The camshaft turns in three bearings which are formed in castings, and upon the hinged upper halves of the latter are mounted the shafts of the rocker arms. These can be easily removed, being held in their longitudinal alignment upon their

shafts only by webs projecting downward from the inside of the aluminum camshaft casing, so as to be released when the casing is raised. A special cam at the rear end of the camshaft drives a small pulsater or pump which takes care of the gasoline feed to the carbureter. A refinement serving to regulate the rotary movement of the camshaft by setting up a certain resistance to its movement during the periods between the impulses of the rocker arms, consists in two extra cams, K in Fig. 3, of a shape experimentally determined which rub against spring-actuated brake shoes during these periods. This provision secures absolute continuity of contact in the helicoid gears.

Ingenious Disposal of Valves and Plugs

With this construction a valve cannot be dismantled without dismantling the entire cylinder casting, but for this reason the valve stems are made 50 per cent. heavier than usual and materials are so chosen, the cooling so safeguarded that the builders feel themselves able to assert that valves under no circumstances will break. Owing to the position given the spark plugs, see Figs. 5 and 6, the valves and valve seats can be directly observed when the plugs are removed. By means of oil or soap water it can be ascertained whether grinding is necessary, and if this is found to be the case the grinding can be done against the seat without dismantling anything, a pencil or similar object being first inserted through the plug hole to prevent the valve from falling down in the cylinder.

The position of the spark plugs, of which there are two for each cylinder, is advantageous in another way. The terminals come very close to the top of the piston at high center, so as to be bathed in an ignitable mixture, even if the charge has had time to settle after a stop of the car, and this makes starting by the spark dependable.

A centrifugal pump with two separate chambers and eccentric vanes circulates the lubricating oil. One portion of the pump sends oil to four troughs into which the connecting-rods dip a

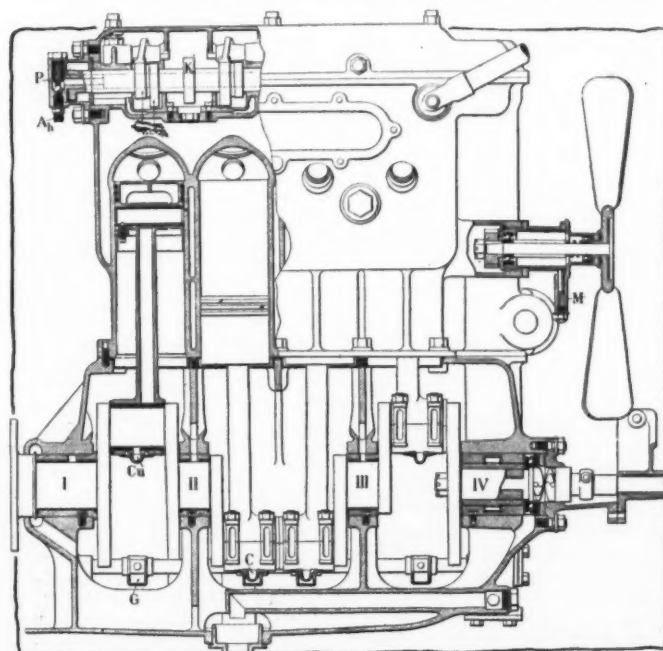


Fig. 1—Hispano-Suiza motor; I, II, III, IV, crankshaft bearings; G, oil troughs; P, oil chamber for camshaft; Ah, oil tube attachment; M, lever for turning off the fan

small spoon at each turn in the now usual manner, and the front edge of each trough is lower than the other edges so as to regulate the height of the oil, the surplus dropping over this edge. When the car is climbing an incline this front edge of each trough is raised, and the oil naturally rises to a slightly higher level under the dipping spoon, providing a more liberal feed corresponding to the harder work of the motor and the increased pressure in the bearings [but how this feature works when the car is going down a long hill with the motor working either on low gear or as a brake is not stated.—Ed.].

Oiling of the Camshaft

The other portion of the pump raises a column of oil to a ball valve chamber, see Fig. 1, connected with the bore of the hollow camshaft at the rear end of the latter and built in one piece with the housing of the pulsator. On its way through the camshaft bore the oil is distributed through perforations to the three camshaft bearings and from these to small troughs under the cams, but the bulk of it passes through the shaft to the compartment in front in which the upper end of the helicoid driving gear is working, lubricates this and passes down the turret, oiling the vertical shaft and at the same time the gears which drive the fan, the pump and the magneto, finally arriving at the lower helicoid gears in considerable quantity, whence it flows back to the crankcase. The surplus gathering in the bottom of the camshaft casing flows back to the reservoir through small tubular conduits. This and also the system for automatic repletion of the crankcase reservoir from an outside tank, on the dash, are shown plainly in Figs. 2, 4 and 6.

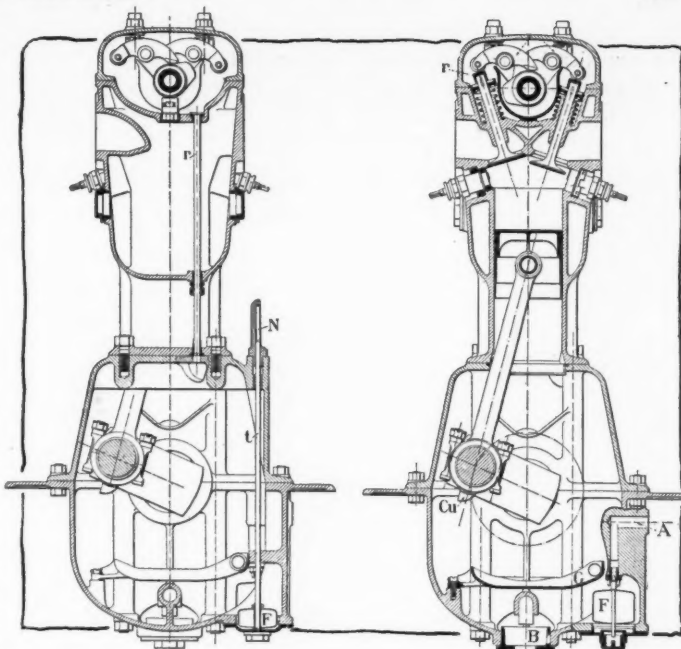
The carbureter is of the three-jet type, two of the jets being active only at the high motor speeds. An extra air inlet is under control by the driver but is used only to compensate for differences in altitude and humidity. A special device, not described, admits of sending a specially rich mixture to the cylinders for starting; it is operated by the turning of the starting crank. It is said that the normal gasoline consumption of the 80 by 130 motor is 11¼ liters for 100 kilometers.

To soften the mechanical drive, by helicoid gears, of the ventilating fan, a pair of friction plates is interposed, and these slip if power is applied suddenly, protecting the slender fan from injury. The fan can also be disengaged completely by means of an eccentric operated by the lever M seen in Fig. 4.

The dash is in the form of a cupboard which is built upon a rigid aluminum frame with double walls and conceals the accessories and conduits which would mar the appearance. From *Vie Automobile*, October 11.

Two Cone Clutches with New Means for Effecting Gradual Engagement

SINCE central alignment in the flywheel, avoidance of end thrusts and reduced momentum have become established features in the design of cone clutches, with a tendency in favor of the reversed cone (partly to keep dust out) and two opposed cones of relatively small diameter for heavy vehicles, the attention of designers has been turned back to further improve-

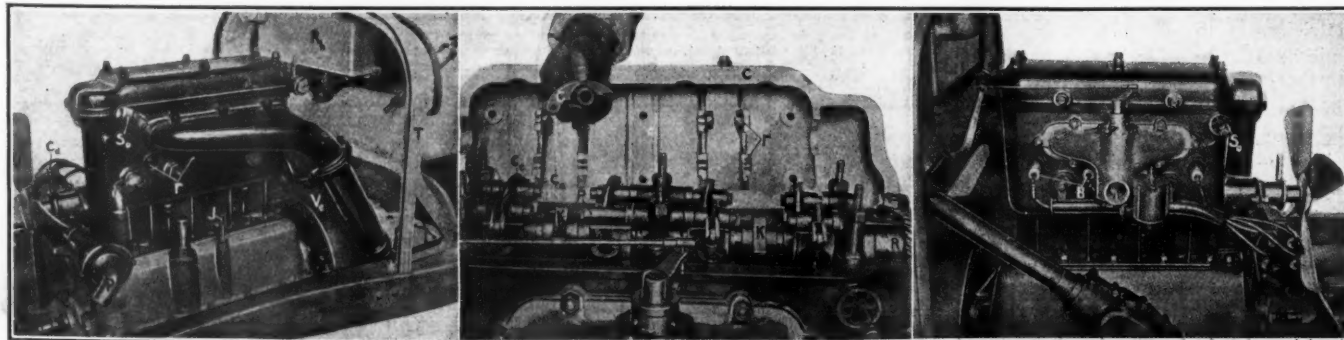


Figs. 5 and 6—r, oil drain from camshaft casing to crankcase; F, float regulating fresh oil flow from reserve; H, oil sight; G, troughs; r (Fig. 6), steel washer cap for valve stem

ment at the point which was most troublesome in early automobiles, viz., the means for securing gradual engagement. The new idea seems to be that it is the movement of the cone which must be made more gradual rather than that anything in the cone surfaces should be changed. In other words, the driver who is inclined to release a clutch too abruptly, because his pedal action is not sufficiently sensitive, should find a counter-acting effect in the clutch itself.

To this end a designer named Verges has devised an air box acting on the principle of a doorcheck. *Auto-Technik* of October 11 gives the illustration of his plan shown to the left in Fig. 7. The air chamber is formed of the piston P which abuts against the flywheel, contacting by packings R with the interior of the drum against which the clutch spring acts. The enclosed air in the space A communicates with the atmosphere by an adjustable valve C and consequently opposes a rapid engagement in proportion to how small this vent is made.

The clutch shown to the right in the illustration is one adopted for the Hispano-Suiza cars referred to in the preceding article. It is of small diameter, as may be seen by comparison with the size of the clutch pedal, and the spring must therefore be unusually strong. According to *Vie Automobile* it is possible with this clutch to go repeatedly from forward to reverse and from reverse to forward without applying the brake or halting the gear lever at neutral, and while the clutch gets hot by thus acting as a transmission brake it is not injured. The construction element by virtue of which this result is obtained is not mentioned, but a glance at the drawing shows a fluted sliding-joint K which is presumably lubricated and must set



Hispano-Suiza motor. Fig. 2—Exhaust side; So, water exit (two of these); r, plug holes; Rh, oil reserve. Fig. 3—Camshaft mechanism, casing open; K, brake cams; helicoid driving gear at extreme right. Fig. 4—Carbureter side; So, water exit; B, spark plugs

up considerable friction against any sudden engagement and the movement of which must also cause the expulsion of some air between the cone surfaces and thereby some cooling of these. The adoption of this clutch is more significant through the fact

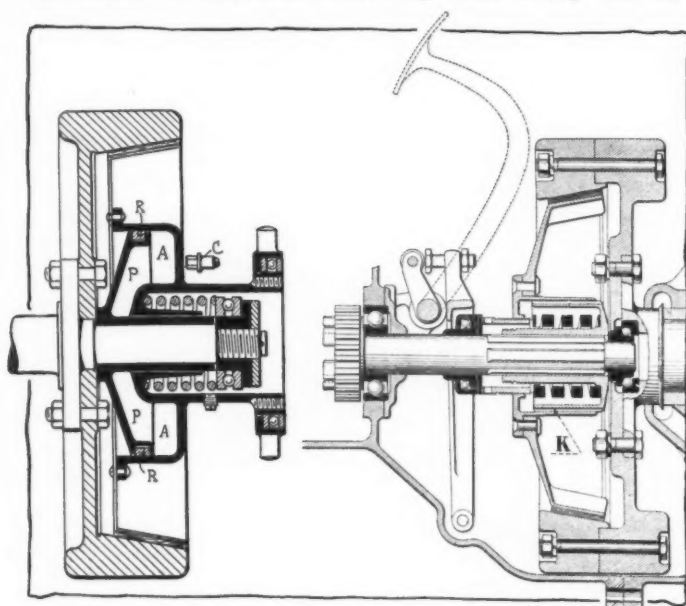


Fig. 7—Verges cone clutch with air check and Hispano-Suiza clutch with fluted and sliding brake surfaces K

that the Hispano-Suiza company was among the first to adopt the multiple disk clutch and has stuck to that type until the present improvement was devised for cone clutches.

Féry's Simple Device for Measuring the Heat Values of Motor Fuels

PROFESSOR Féry, the inventor of the first optical pyrometer, well known to all steel makers, describes a new thermo-electric bomb, or furnace, which he has devised for industrial use in determining the heat value of combustibles, especially liquid fuels. As the instrument requires no special skill for correct manipulation and gives the number of heat units contained in a substance by direct reading, it becomes at once of practical interest in these days when a number of automobile fuels and fuel mixtures are being proposed and tested, frequently under conditions which preclude the use of elaborate testing apparatus. The Féry method was first worked out and described in 1912, but in its first form did not give results of quite the desired accuracy. The improved type now produced always gives the same reading, within one-half per cent, for the same substance.

Water, which has been the medium used in all earlier devices for measuring the number of heat units given out by the combustion of a given amount of a substance, is entirely dispensed with, and its place is taken by metal. The latest construction is shown in Fig. 8. The calorimetric bomb is suspended at the middle of a metallic box A by means of the disk E. The fuel to be tried is placed in the capsule J and is ignited by the action of an electric current passing through a fine wire which is held between two rods K. D is an exterior coating of red copper, about 4 millimeters thick, which it was found necessary to use in order to make the metallic walls of the bomb sufficiently conductive to produce accurate thermo-electric readings. G is an interior lining of nickel which can be readily lifted out in order to weigh the amount of water formed by the combustion. The electric current taken at the exterior terminal G passes through the stems K and brings the fine wire to incandescence, thereby igniting the fuel. The bomb is closed at the top by the plate H upon which the screw-cover is bolted down. Oxygen for the combustion is inducted through the needle valve F and is spread

from the nozzle inside of the bomb through four lateral apertures, so as not to blow the fuel out of the capsule, especially if it is in the form of a powder. L is a millivoltmeter registering the heat developed by the combustion directly in heat units, provided the amount of fuel used corresponds exactly with the unit for which the device has been calibrated. Otherwise the number of heat units may be figured from the reading by means of a simple scale of proportions.—From *Génie Civil*, September 20.

Austria Offers \$10,000 for Tire Material Superior to Solid Rubber

AN international prize of 50,000 krone (\$10,150) is offered by the War Department of Austria-Hungary for the cheapest tire material for motor trucks. Any material submitted must have properties similar to those of rubber with regard to elasticity and road adhesion. It must either be notably more durable or, with equal durability, it must be notably cheaper. Its weight must not exceed that of solid rubber tires. After a preliminary trial of samples submitted the War Department selects those which are to be admitted to complete testing and requests the applicant to furnish four tires. These must be of the same dimensions as the solid rubber tires in competition with which they are to be tested; namely, one pair 830 by 90 by 70 millimeters and the other pair 950 by 150 by 90 millimeters. They must be delivered to the Military Automobile Experimental Division in Vienna within 8 weeks after receipt of the request and the army war department pays the applicant 1500 krone for them when they have been mounted upon an army truck supplied by the Experimental Division. The testing is to be completed within one year, and the prize will be awarded within 15 months after delivery of the tires. The payment of the prize gives the War Department the right for ten years to manufacture, or have manufactured, the tires from the submitted material for its own purposes and, to this end, the contestant must, before the prize is awarded, make known the method of production in all details. The War Department, on the other hand, guarantees that this information will be used only for its own purposes. An arrangement may also be made with the prize-winner to furnish all the tires which the army may want.—From *Der Motorwagen*, September 30.

Error in Table of Aviation Motors

In the table printed in the issue of October 16, page 717, the stroke of the prize-winning Benz motor was given, by misprint, as 102 millimeters instead of 160 and the bore-stroke ratio as .872 instead of .812. The bore-stroke ratio, it should also be mentioned, is given with the stroke as divisor, continental fashion. The motor listed as winner of the fourth prize is one of the upside-down motors specially mentioned in the issue of October 9.

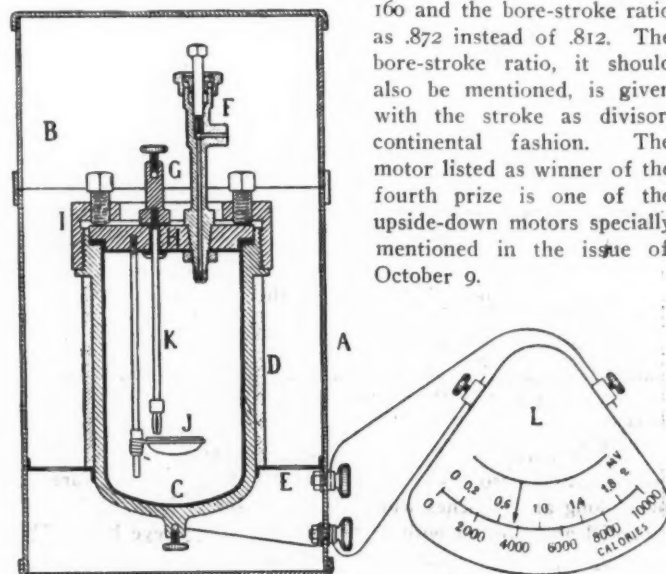


Fig. 8—Féry's "bomb" for telling heat units in fuel

French Motor Sizes for the Last 3 Years

(Continued from page 813)

1912 Bore and stroke, m.m.	1913 Bore and stroke m.m.	1914 Bore and stroke m.m.	Bore and stroke Inches	S.A.E. h.p.	Method of casting cylinders	1912 Bore and stroke, m.m.	1913 Bore and stroke m.m.	1914 Bore and stroke m.m.	Bore and stroke Inches	S.A.E. h.p.	Method of casting cylinders
BRASIER						COTTIN-DESGOUTTES					
67x110	No change	67x110	2.64x4.33	10.60	Bloc L	70x120	Not made	80x160	3.15x6.30	16.2	Bloc L
70x120	No change	70x130	2.76x5.11	12.00	Bloc L	80x160	No change	90x160	3.54x6.30	20.30	Bloc L
80x130	No change	85x140	3.15x5.51	18.20	Bloc L	100x140	No change	100x160	3.94x6.30	24.80	Bloc L
85x140	No change	85x140	3.45x5.51	18.20	Bloc L	120x160	No change	100x160	3.94x6.30	24.80	Bloc L
90x140	Not made	100x150	3.94x5.91	24.80	Pairs L	130x200	No change				
100x150	No change										
BRISCOE						CRESPELLE					
67x 96	No change	67x 96	2.64x3.78	10.60	Bloc L	65x110	Not made	65x110	2.56x4.33	10.00	Bloc L
80x130	No change	80x130	3.15x5.12	16.20	Bloc L	65x130	No change	68x130	2.68x5.12	11.00	Bloc L
BUCHET						75x120	No change	75x120	2.76x4.72	14.20	Bloc L
60x100	No change	60x100	2.36x3.94	8.00	Bloc L	75x150	No change	80x150	3.15x5.91	16.20	Bloc T
65x100	No change	65x100	2.56x3.94	10.00	Bloc L	85x160	Not made	80x180	3.15x7.09	16.20	Bloc T
75x120	No change	75x130	2.99x5.12	14.60	Bloc L						
BUGATTI						DAIMLER					
65x110	No change	65x110	2.56x4.33	10.00	Bloc head	90x130	No change	90x130	3.54x5.12	20.30	Pairs Knight
LA BUIRE						110x130	No change	110x130	4.35x5.12	30.00	Pairs Knight
65x130	No change	Not made	2.95x5.91	14.2	Bloc L	DARRACQ					
70x150	No change	75x150	2.95x5.91	14.2	Bloc L	68x120	Not made	75x120	2.95x4.72	14.20	Bloc L
75x130	No change	80x160	3.15x6.30	16.20	Bloc L	75x120	No change	85x130	3.35x5.12	18.20	Bloc L
80x160	No change	80x160	3.15x6.30	16.20	Bloc L	80x120	Not made	85x130	3.35x5.12	18.20	Bloc L
85x140	No change	Not made				100x140	No change	Not made			
90x140	No change	90x160	3.54x6.30	20.30	Bloc L	85x130	Not made	Not made			
90x160	No change	90x160	3.54x6.30	20.30	Bloc L	95x140	Not made				
105x150	Not made					80x130	Not made				
CHARRON						DELAGE					
65x120	No change	65x120	2.56x4.33	8.00	Bloc L	62x110	Not made	65x110	2.56x4.33	10.00	Bloc L
80x120	No change	80x120	3.15x4.72	10.00	Bloc L	65x110	No change	65x110	2.56x4.33	10.00	Bloc L
95x130	No change	80x150	3.15x5.91	16.20	Bloc L	75x120	No change	75x130	2.95x5.12	14.20	Bloc L
110x150	No change	Not made				80x149	Not made				
CHENARD WALKER						DELAHAYE					
65x120	No change	65x120	2.56x4.72	10.00	Bloc L	62x100	No change	62x100	2.44x3.94	8.30	Bloc L
75x120	No change	70x130	2.76x5.12	12.00	Bloc L	65x120	No change	65x120	2.56x4.72	10.00	Bloc L
80x150	No change	75x150	2.95x5.91	14.20	Bloc L	75x130	No change	75x130	2.95x5.12	14.20	Bloc L
		80x150	3.15x5.91	16.20	Bloc L	80x130	No change	80x130	3.15x5.12	16.20	Bloc L
CLEMENT-BAYARD						85x130	No change	85x130	3.35x5.12	18.20	Bloc L
60x120	No change	60x120	2.36x4.72	8.00	Bloc L	95x130	No change	95x140	3.74x5.51	22.40	Bloc L
65x120	No change	65x120	2.56x4.72	10.00	Bloc L	110x150	No change	110x150	4.33x5.91	30.00	Bloc L
70x110	No change	Not made				130x150	No change	130x150	5.12x5.91	37.70	Bloc L
75x110	No change	80x130	3.15x5.12	16.20	Pairs L	DELAUGERE-CLAYETTE					
80x120	No change	90x140	3.54x5.51	20.30	Pairs L	85x120	No change	85x120	3.35x4.72	18.20	Non-poppet
85x140	No change	90x140	3.54x5.51	20.30	Bloc L	85x120	No change	85x120	3.35x4.72	18.20	Bloc L
90x130	No change	90x130	3.54x5.12	20.30	Pairs Knight	75x120	No change	75x120	2.95x4.72	14.20	Bloc L
100x140	Not made	100x140	3.94x5.51	24.80	Pairs L	DELAUNAY-BELLEVILLE					
100x140	Not made	100x140	3.94x5.51	24.80	Pairs L	85x130	No change	85x130	3.35x5.12	18.20	Pairs L
70x120	No change	75x120	2.95x4.72	14.20	Bloc L	100x140	No change	100x140	3.94x5.51	24.80	Pairs L
65x130	No change	65x130	2.56x5.12	10.00	Bloc L	DIATTO					
75x150	No change	75x150	2.95x5.91	14.20	Bloc L	80x120	No change	80x120	3.15x4.72	16.20	Bloc L
80x140	Not made										
100x140	Not made										

(Continued on page 834)

Haynes Adopts Electric Gearshift for 1914

(Continued from page 822.)

gears. The shafts are carried on four tapered Timken roller bearings and the driveshaft is a 1.5-inch square. The jack-shaft has a diameter of 1.25 inch and the distance between the bearings of this shaft is 7 inches.

The rear axle is a Timken floating design. The bevel gears have a pitch of 4.5 inches and the material of the gears is chrome-nickel steel. The face of the bevel gear is 1.375 inch and the pressure angle of the teeth is 20. The pinion shaft is made from nickel steel and is 1.5 inch in diameter. The drive is taken from the differential through 1.25 inch axle shafts of chrome-nickel steel and is transmitted to the wheel through a six-jaw clutch.

Both sets of brakes are carried on the rear wheels, one set is contracting and the other expanding. The external contracting brakes have a drum diameter of 15.5 inches and the internal brakes are operated on a 15-inch drum. The width of the brakes are 2.125 inches. The brakes are lined with Autobestine.

The drive from the rear axle is transmitted to the car through the springs and through a pressed steel torsion bar. The rear springs which also perform the duties of radius rods are 48 inches long and 2 inches wide. The rear spring bushing is steel hardened and ground with a .5 inch nickel steel eye bolt. The front springs are 39.125 inch in length, and 2 inches wide. Steering is through a worm and gear, having a 10 to 1 reduction.

The weight of the model 26 car complete is 3,800 pounds, model 27 weighs 4,000 pounds.

The four-cylinder model is of exactly the same design as the chassis described above with the exception of a few parts, which are made lighter on account of its smaller size. It has the Vulcan gearshift and all the refinements mentioned. The principal points of difference are the following:

The horsepower rating on account of four instead of six cylinders is 28.9, according to the A. L. A. M. rating, the piston displacement 312 inches, three instead of four main bearings, but these are of the same size, and a 95 pound instead of 84.5 pound flywheel is used. The capacity of the oil reservoir is 10 quarts instead of 15.

Instead of a Timken axle a McCue is used on the four, the same gear ratios and gear materials are used, same clutch, but heavier axle shafts. The latter in the four are 1.375 inches, as compared to 1.25 inch in the sixes. The rear wheel drive is taken through a flange in the four in place of the jaw clutch.

The brakes on the four are double expanding of 12 and 16 inches diameter respectively. Steering is the same. The tires used on the four are 34 by 4 inches, while on the six they are 36 by 4.5 inches. These notations indicate the principal differences in the two chassis. Both are made in 56 and 60 inch tread.

French Motor Sizes for the Last 3 Years

(Continued from page 833)

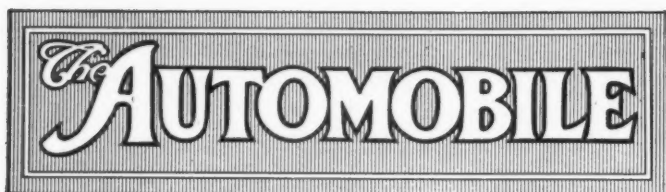
1912 Bore and stroke, m.m.	1913 Bore and stroke m.m.	1914 Bore and stroke m.m.	Bore and stroke Inches	S.A.E. h.p.	Method of casting cylinders	1912 Bore and stroke, m.m.	1913 Bore and stroke m.m.	1914 Bore and stroke m.m.	Bore and stroke Inches	S.A.E. h.p.	Method of casting cylinders
DE DION-BOUTON											
66x120	No change	Not made	.....	.....	.....	75x120	No change	75x120	2.95x4.72	14.20	Bloc L
84x130	Not made	.....	.....	.....	.....	80x130	.....	80x130	3.15x5.12	16.20	Bloc L
75x130	No change	75x130	2.95x5.12	14.20	Bloc L	90x130	No change	90x130	3.54x5.12	20.30	Bloc L
66x120	No change	56x120	2.20x4.72	7.70	.....	110x150	Not made	95x160	3.74x6.30	22.40	Bloc L
70x130	75x130	Not made	.....	.....	.....	125x160	125x170	125x170	4.92x6.69	39.70	Pairs bloc
80x140	No change	80x140	3.15x5.51	16.20	Bloc L	MATHIS					
100x140	No change	Not made	.....	.....	.....	.....	.....	58x100	2.28x3.94	8.30	Bloc L
D. F. P.						.....	.....	65x100	2.56x3.94	10.00	Bloc L
65x120	No change	65x120	2.56x4.72	10.00	Bloc L	.....	.....	70x120	2.76x4.72	12.00	Bloc L
70x130	No change	70x130	2.76x5.12	12.00	Bloc L	.....	.....	90x135	3.54x5.51	20.30	Bloc L
80x150	No change	80x130	3.15x5.12	16.20	Pairs L	.....	.....	100x140	3.94x5.51	24.80	Bloc L
DUMONT						MERCEDES					
.....	.....	100x170	3.94x6.69	6.20	Single	70x120	No change	70x120	2.76x4.72	12.00	Bloc L
ESPAGNAT						80x130	No change	80x130	3.15x5.12	16.20	Bloc L
.....	.....	80x180	3.15x7.09	16.20	Bloc T	90x140	No change	80x130	3.15x5.12	16.20	Pair Knight
F. N.						110x150	No change	110x130	4.33x5.12	30.00	Pair L
74x 90	60x130	60x110	2.36x4.33	8.00	Bloc L	120x160	No change	Not made	.....	.....	.....
80x120	85x130	69x130	2.72x5.12	11.40	Bloc L	140x160	No change	Not made	.....	.....	.....
125x140	Not made	85x120	3.35x4.72	18.20	Pairs T	130x180	No change	Not made	.....	.....	.....
FIAT						MINERVA					
70x120	No change	70x120	2.76x4.72	12.00	Bloc L	82x110	75x120	70x120	2.76x4.72	12.00	Bloc L
80x130	80x140	80x140	3.15x5.51	16.20	Bloc L	102x125	Not made	.....	.....	.....	.....
100x140	No change	100x140	3.94x5.51	24.80	Bloc L	124x130	Not made	.....	.....	.....	.....
110x150	No change	110x150	4.33x5.91	30.00	Bloc L	80x125	90x130	90x130	3.54x5.12	20.30	Pairs Knight
130x170	Not made	130x170	5.12x6.69	37.70	Bloc head	100x140	No change	100x140	3.94x5.51	24.80	Pairs Knight
130x190	Not made	130x190	5.12x7.48	37.70	Bloc head	124x150	No change	124x150	4.88x5.91	39.00	Pairs Knight
F. I. F.						METALLURGIQUE					
.....	.....	65x110	2.56x4.33	10.00	Bloc L	.....	75x 96	75x 96	2.95x3.78	14.20	Bloc L
.....	.....	75x120	2.95x4.72	14.20	Bloc L	80x130	No change	80x130	3.15x5.12	16.20	Bloc L
.....	.....	75x150	2.95x5.91	14.20	Bloc L	90x140	No change	90x140	3.54x5.51	20.30	Bloc L
FORSTER						102x150	No change	101x150	3.98x5.91	25.10	Pairs L
.....	.....	105x120	4.13x4.72	6.80	Single	125x150	No change	125x150	4.92x5.91	39.70	Pairs L
.....	.....	65x100	2.56x3.94	10.00	Bloc L	MORS					
GOBRON						75x120	No change	75x120	2.95x4.72	14.20	Bloc L
70x150	No change	75x150	2.95x5.91	14.20	Bloc L	80x120	85x150	85x150	3.35x5.91	18.20	Bloc L
80x160	No change	80x160	3.15x6.30	16.20	Pairs L	100x140	Not made	.....	.....	.....	.....
90x180	No change	100x200	3.94x7.87	24.80	Pairs L	.....	75x120	75x120	2.95x4.72	14.20	Bloc Knight
110x250	No change	110x250	4.33x9.85	30.00	Pairs L	.....	90x130	90x130	3.54x5.12	20.30	Pairs Knight
GREGOIRE						.....	100x140	100x140	3.94x5.51	24.80	Pairs Knight
80x110	Not made	.....	.....	.....	.....	.....	124x150	124x150	4.88x5.91	39.00	Pairs Knight
100x170	Not made	.....	.....	.....	.....	MOTOBLOC					
65x130	65x130	65x130	2.56x5.12	10.00	Bloc L	65x120	No change	65x120	2.56x4.72	10.00	Bloc L
80x110	No change	70x140	2.76x5.51	12.00	Bloc L	80x120	No change	80x120	3.15x4.72	16.20	Bloc L
80x130	No change	80x110	3.15x4.33	16.20	Bloc L	80x148	No change	80x148	3.15x5.83	16.20	Bloc L
80x160	No change	80x160	3.15x6.30	16.20	Bloc L	90x130	No change	Not made	.....	.....	.....
HESPEL (D.S.P.L.)						90x160	No change	Not made	.....	.....	.....
.....	.....	80x140	3.15x5.51	16.20	Bloc L	100x140	Not made	.....	.....	.....	.....
HISPANO-SUIZA						NAGANT					
80x110	No change	Not made	.....	.....	.....	70x118	75x118	70x118	2.76x4.65	12.00	Pairs L
80x130	No change	80x130	3.15x5.12	16.20	Bloc head	90x120	83x120	90x130	3.54x5.12	20.30	Pairs L
80x180	No change	90x150	3.54x5.91	20.30	Bloc head	90x130	No change	90x150	3.54x5.91	20.30	Pairs L
.....	.....	80x180	3.15x7.09	16.20	Bloc T	106x130	115x125	95x160	3.74x6.50	22.40	Pairs L
.....	.....	100x180	3.94x7.09	24.80	Bloc head	106x150	130x160	106x130	4.17x5.12	27.80	Pairs L
H. L.						PANHARD					
80x130	No change	80x130	3.39x5.12	18.60	Bloc L	80x120	Not made	70x140	2.76x5.51	12.00	Bloc L
80x150	No change	80x150	3.15x5.91	16.20	Bloc L	80x120	No change	80x120	3.15x4.72	16.20	Bloc L
HOTCHKISS						80x120	No change	Not made	.....	.....	.....
80x120	No change	80x130	3.15x5.12	16.20	Bloc L	80x130	No change	80x130	3.15x5.12	16.20	Pairs Knight
95x130	No change	95x140	3.74x5.51	22.40	Bloc L	90x130	Not made	.....	.....	.....	.....
110x150	No change	110x150	4.33x5.91	30.00	Pairs L	100x130	Not made	100x140	3.94x5.51	24.80	Single Knight
HURTU						PEUGEOT					
70x100	70x110	70x110	2.76x4.33	12.00	Bloc L	55x 90	55x 90	55x 90	2.17x3.54	7.50	Bloc T
80x110	75x120	75x120	2.95x4.72	14.20	Bloc L	68x130	68x138	68x138	2.68x5.43	11.00	Bloc V
90x120	Not made	90x120	3.54x4.72	20.30	Pairs L	80x130	No change	Not made	.....	.....	.....
105x130	Not made	105x130	4.13x5.12	27.20	Pairs L	80x140	No change	80x140	3.15x5.51	16.20	Bloc L
ISOTTA-FRASCINI						90x150	No change	Not made	.....	.....	.....
74x130	75x130	75x130	2.95x5.12	14.20	Bloc L	92x150	No change	Not made	.....	.....	.....
85x130	No change	85x130	3.35x5.12	18.20	Bloc L	95x160	No change	95x160	3.74x6.30	22.40	Pairs L
100x140	No change	100x140	3.94x5.51	24.80	Bloc L	100x160	No change	Not made	.....	.....	.....
110x160	No change	120 160	4.72x6.30	36.30	Bloc L	110x160	Not made	.....	.....	.....	.....
105x180	No change	105x180	4.13x7.09	27.20	Bloc head	120x200	Not made	115x180	4.53x7.09	33.10	Pairs L
.....	.....	130x200	5.12x7.88	37.70	Bloc head	PICCARD-PICTET					
LABOR						80x120	No change	Not made	.....	.....	.....
.....	.....	75x120	2.95x4.72	14.20	Bloc L	80x140	No change	80x140	3.15x5.51	16.20	Pairs L
.....	.....	110x140	4.33x5.51	30.00	Bloc T	90x130	90x150	90x170	3.54x6.70	20.30	Pairs L
LUXIOR						100x140	100x150	100x150	3.94x5.91	18.20	Pairs non-pop
.....	.....	66x130	2.60x5.12	.....	2-cycle	.....	.....	.....	.....	24.80	Pairs non-pop
.....	.....	75x100	2.95x3.94	.....	2-cycle	65x120	No change	Not made	.....	.....	.....
.....	.....	75x120	2.95x4.72	.....	2-cycle	55x110	No change	55x110	2.17x4.33	7.50	Bloc T
MAJOLA						75x110	No change	80x140	3.15x5.51	16.20	Bloc T
.....	.....	59x 90	2.32x3.54	8.60	Bloc head	90x120	No change	100x140	3.94x5.51	24.80	Bloc T
.....	.....	65x100	2.56x3.94	10.00	Bloc head	85x185	110x180	110x180	4.33x7.09	30.00	Bloc T
MARTINI						100x120	100x140	Not made	.....	.....	.....
80x120	No change	80x120	3.15x4.72	16.20	Bloc L	124x140	No change	Not made	.....	.....	.....
90x140	No change	80x130	3.15x5.12	16.20	Bloc L	PIPE					
110x140	Not made	90x140	3.54x5.51	20.30	Bloc head	75x110	No change	75x120	2.95x4.72	14.20	Bloc L
125x140	Not made	.....	.....	.....	.....	80x150	No change	80x150	3.15x5.91	18.20	Bloc L
.....	.....	.....	.....	.....	.....	100x180	No change	100x180	3.94x7.09	24.80	Pairs L
LANCIA						90x105	Not made	.....	.....	.....	.....
100x130	No change	80x130	3.15x5.12	16.20	Bloc L	140x180	No change	120x200	4.72x7.87	36.30	Pairs head
.....	.....	100x130	3.94x5.12	24.80	Bloc L	PONETTE					
.....	.....	110x130	4.33x5.12	30.00	Bloc L	.....	.....	65x100	2.56x3.94	10.00	Bloc L
PORTHOS						.....	.....	70x130	2.76x5.12	12.00	Bloc L
.....	.....	.....	.....	.....	.....	.....	.....	90x130	3.54x5.12	20.30	Bloc L

French Motor Sizes for the Last 3 Years

1912 Bore and stroke, m.m.	1913 Bore and stroke, m.m.	1914 Bore and stroke, m.m.	Bore and stroke Inches	S.A.E. h.p.	Method of casting cylinders	1912 Bore and stroke, m.m.	1913 Bore and stroke, m.m.	1914 Bore and stroke, m.m.	Bore and stroke Inches	S.A.E. h.p.	Method of casting cylinders
RENAULT						SIZAIRE-NAUDIN					
70x110	.....	75x120	2.95x4.72	14.20	Bloc L	120x140	Not made	Not made	.....	.....	.....
80x120	.....	80x120	3.15x5.12	16.20	Pairs L	70x170	No change	65x120	2.56x4.72	10.00	Bloc L
90x140	.....	90x140	3.54x5.51	20.30	Pairs L	.....	.....	75x120	2.95x4.72	14.20	Bloc L
100x160	.....	95x160	3.74x6.30	22.40	Pairs L	.....	.....	75x130	2.95x5.12	14.20	Bloc L
130x160	.....	100x160	3.94x6.30	24.80	Pairs L	.....	.....	70x170	2.76x6.69	12.00	Bloc T
ROCHET-SCHNEIDER						.....	.....	80x150	3.15x5.91	16.20	Bloc L
70x120	No change	Not made	.....	.....	.....	.....	.....	S. P. A.			
80x130	75x130	80x130	3.15x5.12	16.20	Bloc L	.....	.....	75x120	2.95x4.72	14.20	Bloc L
80x130	80x140	Not made	.....	.....	.....	.....	.....	85x120	3.35x4.72	18.20	Bloc L
95x130	95x150	95x140	3.74x5.51	22.40	Bloc L	.....	.....	85x140	3.35x5.51	18.20	Bloc L
105x150	110x160	110x140	4.33x5.51	30.00	Bloc L	.....	.....	100x140	3.94x5.51	24.80	Bloc L
ROLLAND-PILIAN						.....	.....	100x200	3.94x7.87	24.80	Bloc L
70x110	.....	65x120	2.56x4.72	10.00	Bloc L	STABILIA					
80x110	.....	70x120	2.76x4.72	12.00	Bloc L	.....	.....	75x120	2.95x4.72	14.20	Bloc L
80x140	.....	80x140	3.15x5.51	16.20	Bloc L	.....	.....	75x150	2.95x5.91	14.20	Bloc L
85x140	.....	90x140	3.54x5.51	20.30	Bloc L	.....	.....	80x150	3.15x5.91	16.20	Bloc L
105x150	Not made	.....	.....	.....	.....	SUNBEAM					
110x165	Not made	.....	.....	.....	.....	.....	.....	80x150	3.15x5.91	16.20	Bloc L
130x165	Not made	.....	.....	.....	.....	.....	.....	90x160	3.54x6.30	20.30	Bloc L
130x270	Not made	.....	.....	.....	.....	TURCAT-MERY					
ROLLING						.....	.....	80x130	3.15x5.12	16.20	Bloc L
.....	.....	60x100	2.36x3.94	8.00	Bloc L	.....	.....	90x130	3.54x5.12	20.30	Bloc L
.....	.....	65x115	2.56x4.53	10.00	Bloc L	.....	.....	90x140	3.54x5.51	20.30	Bloc L
.....	.....	70x120	2.76x4.72	12.00	Bloc L	.....	.....	100x150	3.94x5.91	24.80	Bloc L
.....	.....	75x130	2.95x5.12	14.20	Bloc L	.....	.....	110x160	4.33x6.30	30.00	Bloc L
RONTIEX						UNIC					
.....	.....	62x 80	2.44x3.15	9.50	Bloc L	.....	.....	65x110	2.56x4.33	10.00	Bloc L
.....	.....	65x110	2.56x4.33	10.00	Bloc L	.....	.....	80x130	3.15x5.12	16.20	Bloc L
ROY						.....	.....	90x130	3.54x5.12	20.30	Bloc L
.....	.....	70x100	2.76x3.94	12.00	Bloc L	.....	.....	VERMOREL			
.....	.....	80x120	3.15x4.72	16.20	Bloc L	.....	.....	66x110	2.60x4.33	10.20	.....
.....	.....	90x140	3.54x5.51	20.30	Bloc L	.....	.....	74x120	2.91x4.72	13.80	.....
S. C. A. P.						.....	.....	75x130	2.95x5.12	14.20	.....
.....	.....	65x120	2.56x4.72	10.00	Bloc L	VINOT-DEGUINGAND					
.....	.....	75x130	2.95x5.12	14.20	Bloc L	.....	.....	70x110	2.76x4.33	12.00	Bloc L
.....	.....	80x140	3.15x5.51	18.20	Bloc L	.....	.....	80x110	3.15x4.33	16.20	Bloc L
.....	.....	90x150	3.54x5.91	20.30	Bloc L	.....	.....	80x130	3.15x5.12	16.20	Bloc L
.....	.....	90x170	3.54x6.69	20.30	Bloc L	.....	.....	85x130	3.35x5.12	18.20	Pairs L
S. C. A. R.						.....	.....	100x150	3.94x5.91	24.80	Pairs L
69x140	Not made	69x130	2.72x5.12	11.30	Pairs L	.....	.....	VIOLET-BOGEY			
80x140	No change	80x140	3.15x5.51	16.20	Pairs L	.....	.....	73x130	2.87x5.12	6.60	2-cyl. L
SCHNEIDER (TH)						.....	.....	VAUXHALL			
.....	.....	70x120	2.76x4.72	12.00	Bloc L	.....	.....	90x1203	3.54x4.72	20.30	Bloc L
.....	.....	75x130	2.95x5.12	14.20	Bloc L	.....	.....	95x140	3.74x5.51	22.40	Bloc L
.....	.....	80x140	3.15x5.51	16.20	Bloc L	.....	.....	WOLSELEY			
.....	.....	95x140	3.74x5.51	22.40	Bloc L	.....	.....	90x121	3.54x4.76	20.30	Pairs L
.....	.....	110x160	4.33x6.30	30.00	Bloc L	.....	.....	ZEDEL			
SIZAIRE-BERWICK						.....	.....	72x120	2.83x4.72	13.00	Bloc L
.....	.....	90x160	3.54x6.30	20.30	Bloc L	.....	.....	75x120	2.95x4.72	14.20	Bloc L
.....	.....	.....	.....	.....	.....	.....	.....	90x140	3.54x5.51	20.30	Bloc L

Comparison of Six and Eight-Cylinder Motors at Paris Salon for 1913 and 1914

1913	SIX-CYLINDER CARS	1914	1913	SIX-CYLINDER CARS	1914
Aquila-Italiana	80x130	80x130 Bloc head	Fiat	80x130	Withdrawn
Aries	75x120	Withdrawn	Hotchkiss	95x130	Withdrawn
Bazelaire	75x120	Withdrawn	Hudson	.....	89x127 Threes L 105x133 Threes L
Bollee	83x110	83x110 Pairs L	Motobloc	.....	80x120 Bloc L
Brasier	.....	90x140 Bloc L	Packard	.....	100x140 Threes L 115x140 Threes L
Buire (La)	85x140	85x140 Bloc L	Mercedes	120x150	Withdrawn
Charron	80x120 95x130	Withdrawn 95x130 Threes L	Panhard	100x140	90x130 Sep. Knight 100x140 Sep. Knight
Chenard & Walcker	80x150	Withdrawn	Pilain	65x120	65x130 Bloc L
Clement-Bayard	70x110 80x120	Withdrawn Withdrawn	Renault	80x140 100x160	85x150 Threes L 100x160 Threes L
Darracq	85x120	Withdrawn	Roy	80x120	Withdrawn
Delage	65x130	65x130 Bloc L	Schneider (Th)	75x130	Withdrawn
Delahaye	75x120	75x120 Bloc V	Rolls-Royce	114x121	114x121 Threes L
Delaunay-Belleville	75x120 85x130 100x140	78x140 88x150 103x160 85x130 Threes L 100x140 Threes L	EIGHT-CYLINDER CARS		
D.F.P.	80x130	Withdrawn	De Dion-Bouton	70x130 90x140	66x130 Blocs L 75x130 Blocs L 94x140 Blocs L



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The 1914 French Car

SIXTY-TWO per cent. of the French cars to be built during 1914 will have cylinder bore diameters between 70 and 85 millimeters, between 2 4/5 and 3 2/5 inches, and, placing France's output for 1914 at 100,000 cars, there will be approximately 62,500 of these under 3/5-inch cylinders. To go further, only 7.5 per cent. of their 1914 output will have cylinders over 90 millimeters, or 3.56 inches in diameter, figures that speak eloquently for the small-size, high-efficiency motors that the French industry is now producing.

Small Motors Popular

Statisticians, who made a careful analysis of the 320 French models exhibited at the recent Paris show, have made the following analysis of the motor sizes:

Under 60 millimeters bore.....	5 cars or	1.54 per cent.
Between 60 and 70 millimeters bore	51 "	16.00 "
" 70 " 80 "	75 "	23.42 "
" 80 " 90 "	81 "	25.50 "
" 90 " 100 "	43 "	13.75 "
" 100 " 110 "	27 "	8.42 "
" 110 " 120 "	15 "	4.66 "
Over 120 millimeters bore.....	23 "	7.18 "

These figures show the direction in which the wind is blowing. They show the most popular size to be between 80 and 90 millimeters or 3.20 and 3.60 inches. In a word, 75 per cent. of the models have motors under 3.5 inches cylinder diameter.

To look at these figures practically and through the eyes of the American maker who hopes to increase his export business to France, is it any wonder that some

have found the export field poor, when you contrast the American cylinder sizes with these? One or two makers very recently have brought out motors with 3.5-inch bore. They feel that they have established a new low level, yet as a matter of fact they are still above what the French builder designates his high level.

These figures suggest the same necessity of many American makers building special European models, if they hope to reap the business from Europe which it is possible to secure. To-day, lower prices are selling American cars in Great Britain and Continental Europe, but the added cost of upkeep is holding back the growth of the industry at a rapid rate. The American feels he cannot use as small motors as do the French because his body-weights are much higher. If not, then cut the body-weights and cut the motor sizes, both of which can be done on special European models. The European wants a four-passenger body, he is not after the wide three-passenger rear seat. With his four-passenger body a 52-inch tread is more general. He wants a car of lower clearance than we are marketing, one with a low body and comfortable well-tilted seats, not with 10 inches of cushion, but with 4 or 5 inches, but with a comfortable angle of back and seat to give a part-reclining attitude instead of the sit-up-straight posture that we make for in America.

Small Bodies in Demand

The weight-reducing problem of a European model can be carried out in many ways. Demountable rims can be left off, and a detachable wire wheel equipment used with straight clincher rims, which suit European buyers very well. A two-piece windshield is not needed, rather a low one-piece shield will meet all requirements. The old-time gas generator, with small sized headlights, are enough and the weight of electric lighting equipment or gas tank lighting can be saved. Instead of the heavy tailored top, a light un-lined folding one without expensive side curtains will suffice. In a word, people who live in unheated homes during the winter are not so fastidious as those living in steam-heated flats in America. Adopting these possible changes, and they are in accord with the wishes of the big mass of European buyers of small-motored cars, will permit of reducing the weight and so getting proportionately more out of the smaller sized motors.

The special European model is more feasible now that left-side steering is becoming vogue in America and will not sell in England, one of Europe's biggest consuming countries. Frequently left-side chassis layout means a general re-arrangement of motor parts and a switching of valves, etc. When making such a change it would be possible to build up a new chassis using 95 per cent. of the parts in the old one. This would constitute an European model, one that would more nearly meet the desires of the European buyer, a chassis with parts strong enough to stand up under the high-speed work on the French roads, and a chassis that would sell quickly and so partly save in the merchandizing and the added cost of production. If the European business is worth while, then it is worth while going after it on a sane basis, and not trying to force on the Continental buyer a chassis that appeals to him so far as price is concerned but who dislikes it in most other respects.

Restricted Credit Hampers Pope Finances

Two Creditors Ask for Receivership—Factory Actively To Continue, and 1914 Program To Be Followed Out—George Pope Receiver

HARTFORD, CONN., Oct. 27—The Pope Mfg. Co., maker of Pope-Hartford cars, was placed in receivership this afternoon by order of Judge Joseph P. Tuttle, the receivership being granted in response to the request of one creditor and Frederick F. Small, a stockholders in the company. Col. George Pope has been appointed receiver under bond of \$200,000. The receivership comes as a result of indebtedness approximating \$1,700,000 of which \$700,000 is due various creditors, and \$1,000,000, consists of notes due April 1, 1914.

There have been many rumors concerning the credit of the company for several months past and when it was impossible to have a quorum at two calls for the annual meeting the situation was considered serious. A third call had been issued for Wednesday, October 30, for the annual meeting. According to Court order there will be a hearing on the confirmation of the present receivership and appraisers will be appointed in the Superior Court room, Hartford, November 7, 10 a. m. The Court orders show the indebtedness to one company to be \$4,739.47, and that one stockholder has 205 shares of preferred stock.

Deficit of \$181,780 for 1913

The annual statement of the company recently issued showed a deficit for the year of \$181,780, and the income from operation for the year ending July 31, 1913, was \$259,239, as compared with \$316,877 for the previous year.

Col. George Pope, receiver, has issued a statement through his counsel giving the cause of the receivership as due to restricted credit, largely owing to the maturity of \$1,000,000 notes in April. Receiver Pope anticipates a continuation of the automobile, bicycle and motorcycle business of the company under the receivership, and for a re-financing of the company and the organizing of a vigorous 1914 campaign. The hope is held out that creditors will be paid dollar for dollar, although nothing definite will be known on this before the November meeting is held and the receiver's report on conditions submitted.

It is generally known that, although the Pope company employed upwards of 1,000 men, when its factory was at capacity, that of late comparatively few, not more than 100, have been at work.

Some months ago the company announced its policy of building six-cylinder cars exclusively for 1914, and at this time it announced a cut in price in the 1913 four-cylinder model from \$2,250 to \$1,650 or almost 26 per cent. This move was looked upon as a means of cleaning up the 1913 product and getting ready money. That the company's plans for 1914 were well matured is shown by the fact that a complete stock of parts for next year has been ordered.

Incorporated in 1908

The Pope Mfg. Co. was incorporated in Connecticut, December 21, 1908, as a reorganization of the Pope Mfg. Co. of New Jersey, the latter company having been incorporated February 27, 1903, as a consolidation of the American Bicycle Co., and the American Cycle Co. and placed in receivership August 13, 1907. In November, 1908, this receivership was ended through purchase by the reorganization committee of the plants and other assets of the Pope Mfg. Co. for \$1,500,000. The company owns and operates three plants, the main factory in this city, and the West Works, and the factory at Westfield, Mass., where bicycles and motorcycles are manufactured. On December 23, 1912, the Pope Mfg. Co. was re-incorporated in Massachusetts, with the same capitalization as before and the outstanding stock of the corporation being exchanged dollar for dollar for stock in the new company. The authorized capital stock of the company is \$4,000,000 common, and \$2,500,000, 6 per cent. preferred. Of this there is outstanding \$3,600,800 common, and \$2,980,200 preferred. Share values are \$100; there being 3,092 shares common and 2,018 shares preferred held in the treasury.

On September 21, 1909, an accumulated dividend of 6 per cent. was declared covering the entire year ending July 31, 1909, preferred stocks being entitled to \$2,000,000 dividends as from August 1, 1908. Regular quarterly dividends of 1 1/2 per cent. each have since been declared. A dividend of 2 1/2 per cent. of

common stock was paid July 31, 1910 and a 1 per cent. dividend January 31, 1912.

The \$1,000,000 notes maturing April 1, 1914, are for 2 years at 6 per cent., and the announcement was made when the issue was effected that the proceeds would be used to clear up a floating debt of \$250,000 and leave the balance to increase the working capital and provide for a considerable output of cars during 1913. A portion of this money was applied to the construction of a new factory building. These notes were issued under a trust agreement that the company maintain at all times during the life of the issue a surplus of quick assets over all indebtedness of at least \$500,000 and that no mortgage be placed on any property during the life of the notes.

The majority of stock in the company is held by two interests, Pope and Walker. The officers and directors of the company are: President, Albert L. Pope; first vice-president, C. E. Walker; second vice-president and secretary, W. C. Walker; treasurer, George Pope; and directors, in addition to the above, Edward W. Pope, Henry C. Wiley, Robert M. Currier and F. A. Drury.

Receiver for American Motors

INDIANAPOLIS, IND., Oct. 29—*Special Telegram*—Frank E. Smith, vice-president, was yesterday appointed receiver for the American Motors Co. with order of court to continue manufacturing. There will be no interruption to business. Action was precipitated by a few smaller creditors desirous of forcing immediate payment of their claims, notwithstanding over 90 per cent. had agreed to extension plan which provided for payment of claims in installments.

Cutting Assets Sold

DETROIT, MICH., Oct. 28—The Harris Bros. Co., Chicago, bid in the entire assets of the Cutting Motor Car Co., Jackson, Mich., at the receiver's sale held on the 22nd for the sum of \$35,000. This includes property, merchandise and materials, and in fact everything, except any preferred accounts which may exist. The sale was confirmed by the Federal Court on Oct. 25 and is the outcome of the lengthy negotiations which have been under way to secure more money for the property which is appraised at \$173,155.

The first time the property was offered it was bid in by W. M. Thompson, president of the Jackson City Bank, for \$30,000, the Harrises having offered \$25,000 at that time. But the court refused to accept this bid from Thompson on protest from a number of the creditors that more could be secured by the appointment of a trustee. Bels J. Lincoln, Detroit, was appointed in this capacity and a period of 15 days granted for the securing of further bids. The later Harris bid was the result.

Harris Bros.' bid was in the form of a guarantee of the amount stated, the firm to receive 15 per cent. on the yield of all the assets, any amount realized over the \$35,000 figure being shared in by the creditors. The Harris Bros. concern is now investigating the property and expects to continue the business if conditions warrant.

To Sell McFarlan Property

FRANKFORT, IND., Oct. 24—R. N. Elliott, trustee of the bankrupt McFarlan Carriage Co., has filed a petition asking for authority to sell the real estate belonging to that company, and such petition will come on for hearing at the office of H. C. Sheridan, the referee in bankruptcy, on November 3.

NEW YORK CITY, Oct. 29—Jean Richard, son of Georges Richard, the French automobile manufacturer, has recently graduated from the Ecole Centrale in Paris and has arrived in the United States to take a position in one of the big automobile factories for the purpose of studying American methods.

Court Holds Up I.M.C. Injunction

Is Averse To Granting Permanent Injunction or Appointing Receiver Without Further Affidavits

NEW YORK CITY, Oct. 29—After hearing arguments this morning in special term for motions in the Supreme Court in Brooklyn, relative to the preliminary injunction obtained by minority interests of the International Motor Co. to prevent the consummation of the proposed \$1,200,000 loan, Judge Garretson directed that further affidavits and memoranda be submitted by both sides by 5 o'clock tomorrow afternoon.

Judge Garretson indicated that he was averse to granting a permanent injunction or to appointing a receiver, in a case in which such wide interests were involved, but also indicated that he favored the contention of the minority representatives in connection with an alleged discrepancy of more than \$400,000 in the appraisals of two auditing companies as to the net assets of the Saurer Motor Co., when the latter was about to be taken into the International Motor Co. The minority interests, through an action brought by G. E. Blakeslee, of New Jersey, a stockholder of the International, desire the present preliminary injunction made permanent pending the adjudication of a suit to cancel the contract which led to the taking over of the Saurer and the Mack motor companies by the International, and to dissolve the latter corporation.

Fearing that minority shareholders might plunge the company into a receivership, controlling interests of the company announced that John Calder had resigned as president. Vernon Munroe, the secretary, was chosen as his successor. B. A. Guy, the treasurer, has been made secretary and treasurer.

Discrepancy in Accounts

It is charged by the minority interests that the alleged discrepancy as to the net assets of the Saurer Co. was so fixed up by those interested in the organization of the International Co. that the basic contract by which stockholders of the Mack and Saurer companies agreed to turn over their stocks to the International was fraudulent. On the other hand, representatives of the International contended to the court that the discrepancy had to do with a minimum guarantee of the Saurer Co. for royalties to be paid to the owner and to former licensees of certain patents. The Saurer company was to pay minimum royalties of \$20,000 a year for 3 years and \$40,000 a year for some time thereafter. The defendants in the present action hold that these obligations did not constitute liabilities and that, therefore, they were not deducted from the statement of net assets of the Saurer company.

The attorney for the minority interests, in arguing for the permanency of the injunction asserted that those interested in drawing up the basic contract for the International went several times to the North American Audit Co. in order to urge a reconciliation of some kind of the latter's appraisal of the Saurer assets with that of Ernst & Ernst. The charge was made to the court that the former concern refused this, and that "a paper reconciliation was devised." It was further charged that in organizing the International, a bonus of \$750,000 in common stock was given to one individual and that this bonus aided in giving certain interests complete control of the new company. It was further charged that practically all the officials of the Saurer concern, rather than those of the Mack company, which was recognized as a standard and substantial and paying company, were made the officers of the International, and that these in turn gave positions to personal friends without consideration as to their practical experience.

Plans for Loan Changed

In arguing against the motion, attorneys for the management revealed that the original plan for obtaining the present proposed \$1,200,000 loan had given way to a plan whereby only \$500,000 was to be obtained immediately, without security of any kind beyond payment of 6 per cent. interest and that a further \$500,000 was to be obtained later. They declared that despite the fact that the company has suffered losses in the past year there are no creditors' suits, all creditors having agreed to defer their claims until the new loan was obtained. The present obligations of the company are about \$2,100,000.

It was further held by the defendants that the minority had brought a misjoined suit, and that the court had no power to

appoint a receiver since it was not the International company that was directly concerned in the basic agreement but rather certain individuals.

If permitted to put through the proposed loan, the minority representatives claimed that the result would be a practical wiping out of the preferred stockholders. They charged that the management had been so antagonistic to requests of the minority for information that the latter could only assume that there was something vitally wrong with the company, especially in view of the fact that it was losing money at the rate of about \$50,000 a month, and that a receiver be appointed so that there should be no further burdens put upon present stockholders getting as much as possible in return through a dissolution of the company. The defendants replied, on the other hand, that the present combined assets of the International figured up to more than \$5,000,000 and that to prevent the present loan would be to hamper it so that serious consequences might follow.

Capt. Mitchell-Lewis Starts Company

MILWAUKEE, Wis., Oct. 29—Special Telegram—Capt. Wm. Mitchell-Lewis, former head of the Mitchell-Lewis Motor Co., Racine, Wis., has recently organized a concern capitalized at \$250,000 to be known as the Lewis Motor Co. The new company will market a light six designed by René Petard, work on the first lot of 500 cars beginning on Nov. 3.

Yale & Towne Co. Wins Suit

NEW YORK CITY, Oct. 29—The Yale & Towne Mfg. Co. of this city has won its suit against the General Auto Supply Co., also of this city, for alleged violation of the Yale & Towne trademark. The complaint was that the General Auto Supply Co. sold locks, stating them to be of the Yale type. A permanent injunction and costs have been awarded the complainant.

Error in Zip Cyclecar Description

NEW YORK CITY, Oct. 29—In THE AUTOMOBILE for October 9 the mention of the Zip cyclecar appeared in which it was stated that the car was propelled by a light motorcycle engine and that the purpose of the car was for delivery work. This is incorrect. The Zip cyclecar will not be propelled by a small motorcycle motor and it is not intended for delivery use as far as present plans are concerned. The car will sell for \$395 and not \$300.

Automobile Securities Quotations

A few changes of no import occurred in this week's automobile securities quotations. These few ranged on a decline from 1 to 5 points and from 1 to 2 points on the increase.

	1912		1913	
	Bid	Asked	Bid	Asked
Ajax-Grieb Rubber Co., com.	145	165	150	..
Ajax-Grieb Rubber Co., pfd.	94	99	95	100
Aluminum Castings, pfd.	100	102	98	100
Chalmers Motor Company, com.	..	..	98	102
Chalmers Motor Company, pfd.	..	..	94	100
Consolidated Rubber Tire Co., com.	10	13	35	37
Consolidated Rubber Tire Co., pfd.	50	60	90	95
Firestone Tire & Rubber Co., com.	278	282	260	270
Firestone Tire & Rubber Co., pfd.	106	107 1/2	102	104
Garford Company, preferred.	99	100	85	90
General Motors Company, com.	34 1/2	35 1/2	38	39
General Motors Company, pfd.	76 1/2	78	76 1/2	79
B. F. Goodrich Company, com.	71 1/2	72	21	22
B. F. Goodrich Company, pfd.	106 3/4	107 1/2	88	89
Goodyear Tire & Rubber Co., com.	386	390	270	280
Goodyear Tire & Rubber Co., pfd.	104 1/2	105 1/2	97 1/2	98 1/2
Gray & Davis Co., pfd.	..	..	..	102
Hayes Manufacturing Company	..	90	..	..
International Motor Co., com.	17	19	10	15
International Motor Co., pfd.	76	78	10	15
Lozier Motor Company, com.	..	..	15	..
Lozier Motor Company, pfd.	..	..	..	92
Maxwell Motor Co., common.	..	..	1 1/2	2 1/4
Maxwell Motor Co., 1st pfd.	..	..	20	23
Maxwell Motor Co., 2nd pfd.	..	..	5	7
Miller Rubber Company	135	145	130	135
Packard Motor Company, pfd.	105 1/2	107	95	100
Peerless Motor Company, com.	..	..	25	35
Peerless Motor Company, pfd.	..	..	85	90
Pope Manufacturing Company, com.	28	31	1	4
Pope Manufacturing Company, pfd.	69	71	15	25
Portage Rubber Co., com.	..	..	..	35
Portage Rubber Co., pfd.	..	..	..	92
Reo Motor Truck Company	8	10	7	8
Reo Motor Car Company	19	22	15	17
Rubber Goods Mfg. Co., pfd.	..	..	100	106
Stewart-Warner Speedometer Co., com.	..	..	64	66
Stewart-Warner Speedometer Co., pfd.	43	43 1/2	94	97
Studebaker Company, com.	94 1/2	97	18	20
Studebaker Company, pfd.	94 1/2	97	70	72 1/2
Swinehart Tire Company	98	100	80	85
U. S. Rubber Co., com.	..	..	59 1/2	60
U. S. Rubber Co., 1st pfd.	..	..	104 1/2	105 1/2
White Company, preferred.	105	108	105	110
Willys-Overland Co., com.	..	..	62	64 1/2
Willys-Overland Co., pfd.	..	..	84	92

Freight on Trucks Cut 50 Cents Per 100

Commercial Vehicles Were Formerly Billed at the Same Rate as Passenger Cars—Mixed Load Is Permitted

NEW YORK CITY, Oct. 28.—New freight rates to California for automobiles and motor trucks have been fixed by the Transcontinental Freight Bureau to take effect December 1, 1913 as announced by the General Traffic Department of the Automobile Chamber of Commerce. Under the new rates there is a reduction of 50 cents per 100 pounds on motor trucks which were formerly billed at the same rate as passenger cars. Another advantage of the new rulings is that it is possible to mix carloads, that is, to load passenger cars and commercial vehicles in the same car provided the aggregate weight is sufficiently great. The new tariff provides the following rates:

Automobiles, including delivery wagons with closed tops, hearses and fire fighting apparatus, and extra parts (finished or unfinished—see Note), straight or mixed carloads or in mixed carloads with commercial vehicles not otherwise specified, chassis for such vehicles, tractors and extra parts (finished or unfinished—see Note), minimum carload weights:

	Group A	Group B	Group C	Groups D-E-F-G-H-J
36' car, 10,000 lbs.; 40' car, 10,000 lbs.; 50' car, 12,000.....	\$3.30	\$3.20	\$3.10	\$3.00
NOTE.—Will not include extra Wind Shields, Lamps, Searchlights, Headlights, Speedometers, Cyclometers and Horns.				

Vehicles, freight, self-propelling, N. O. S., (not including delivery wagons with closed tops), chassis for such vehicles, and tractors, and extra parts (finished or unfinished), but not including extra windshields, lamps, searchlights, headlights, speedometers, cyclometers and horns, minimum carload weights:

	Group A	Group B	Group C	Groups D-E-F-G-H-J
36' car, 12,500 lbs.; 40' car, 12,500 lbs.;				
50' car, 15,000 lbs.	\$2.80	\$2.70	\$2.60	\$2.50

NOTE.—In no case shall the charge for a carload shipment of self-propelling freight vehicles handled under rates named in this item exceed the amount charged for a carload shipment of self-propelling passenger vehicles of like weight.

Low Freight Rates to San Diego Exposition

SAN DIEGO, CAL., Oct. 25—All exhibits destined to the Panama-California Exposition, to be held in San Diego from January 1 to December 31, 1913, forwarded from points in the territories covered by the Pacific Freight Tariff Bureau, the Trans-Continental Freight Bureau, the New England Freight Association, the Trunk Line Association (including points in Canada located east of Toronto, Ont.), and the Central Freight Association (including points in Canada, Toronto, Ontario and west thereof), on which full tariff rates are paid coming to the Exposition will be returned carriage free, except race horses and vehicles (including automobiles for racing purposes exhibited at this exposition), goods to be returned by the routes that originally carried and offered for return transportation ninety days after the close of the exposition. Pacific Coast Steamship Co., Pacific Navigation Co. and other coastwise steamers have issued special rates governing the movements of exhibits from points north of San Diego.

To Organize N. Y. State Dealers' Assn.

NEW YORK CITY, Oct. 28—Arrangements have been completed for a meeting at the Hotel Ten Eyck, in Albany, N. Y., on November 20, to which all the automobile dealers' associations in the state have been invited to send delegates, so as to organize a New York State Automobile Dealers' Assn. It is also intended by this association to prepare and introduce bills for the better protection of the automobilists and to introduce bills that will help govern traffic conditions on the highways, and to assist in any way possible to establish good roads in New York.

NEW YORK CITY, Oct. 27.—The annual meeting of the stockholders of the Peerless Motor Car Co. of New York, will be held at the offices of the company, 1760 Broadway, on November 1, for the purpose of electing directors and other business.

LANSING, MICH., Oct. 25—The Reo Motor Truck Co. has lowered the price of its Model J 2-ton heavy duty truck from \$1,800 to \$1,650—chassis only. The body prices remain unchanged. The wheelbase is standard at 130 inches, but an optional wheelbase of 146 inches permits the installing of a 12-foot body without an overhang at the rear. An important improvement in the hydraulic governor provides somewhat more speed without appreciably increasing the fuel consumption of the truck.

MILWAUKEE, WIS., Oct. 28—Motor fuel distributors at Milwaukee, on October 20, announced a reduction of .5 cent in the price of all grades of gasoline, tank wagon delivery, 25 gallons or more. The revised schedule is: 72 per cent., 21 cents; 70 per cent., 20 cents; 65 per cent., 18 cents; 60 per cent., 15 cents. These prices are uniformly 2 cents higher than at the same period a year ago, when 65 per cent. sold at 16 cents.

DETROIT, MICH., Oct. 28.—W. S. Pettit, for the last 3 years advertising manager of the Studebaker Corp. has become sales manager of the Commerce Motor Car Co. of this city. H. B. Bennett, vice-president of the company, becomes general manager.

Indianapolis 1913 Car Output \$14,000,000

INDIANAPOLIS, IND., Oct. 27—Statistics compiled by the Indianapolis Chamber of Commerce concerning the automobile industry in that city show that the value of cars manufactured this year was \$14,000,000. The city has thirteen automobile factories and forty plants manufacturing parts and accessories. The industry employs 14,000 men and output is 16,800 cars; 1,000 are employed in the retail markets of the city.

NEW YORK CITY, Oct. 27—The postponed annual meeting of the United States Motor Co., scheduled for Oct. 22, was postponed for lack of a quorum. Another attempt to hold a meeting will be made on December 22.

Market Changes of the Week

There were few changes in this week's markets. Tin was heavy, weak and lower in all positions in the domestic and London markets on Tuesday. The demand from domestic consumers continued light and was confined mainly to nearby positions. Small sales were recorded at \$39.90 per 100 pounds, at the closing on Tuesday, a loss of \$0.60 for the week. Lead remained dull, but steady, at \$4.35 per 100 pounds. There were small sales recorded for electrolytic copper at \$0.16 3-5 per pound at the closing on Tuesday, at a small decline of \$0.00 3-20. Lake copper remained constant at \$0.16 7-8 per pound, Antimony remains quiet but steady at \$0.06 1-4 per pound. Cottonseed oil dropped \$0.12 per barrel. The situation in the leading crude rubber markets of the world underwent no material change last week, though Fine Up-River Para rose \$0.01. Manufacturers on both sides of the water continue to adhere in many instances to the policy of purchasing in comparatively small quantities for early use, while speculative transactions seem to be in abeyance for the present.

[illegible]

Seeks Injunction on U. S. Tire Mold

De Lashi and Thropp Interests Claim That Type Used By That Company Infringes on Their Patent

NEW YORK CITY, Oct. 27.—A prayer for an injunction, restraining the U. S. Tire Co. from manufacturing or using an apparatus for manufacturing wheel tires, or a tire mold, has been filed in the United States District Court for the Southern District of New York, by The de Lashi and Thropp Circular Woven Tire Co. and the J. E. Thropp's Sons Co. The complainant claims that the U. S. Tire people have infringed on patent No. 822,561, issued to P. D. Thropp, of Trenton, N. J., on June 5, 1906. The complaint involves three other inventors, Ernest Hopkinson, C. L. Pepper and Thomas Midgley, who had in 1905 filed applications for patents covering the same device as Mr. Thropp's.

It seems that the said invention of Mr. Midgley was assigned to the Hartford Rubber Works, Hartford, Conn., covering patent No. 901,006. On or about November 23, 1906, Mr. Pepper sold and assigned his patent rights to Morgan & Wright Tire Co., then a Detroit corporation. Since then, however, the U. S. Tire Co. has bought and now owns a controlling interest in both companies, thus bringing the company into the complaint. A prayer for writ of injunction, as said before, has been brought, asking that the molds in the U. S. Tire Co.'s possession be destroyed or delivered into the complainant's hands and that the income derived therefrom be paid.

Grossman Buys Interest in Barber Patent

NEW YORK CITY, Oct. 25.—The Emil Grossman Mfg. Co., Inc., has acquired a part ownership in patent 732,032, dated June 30, 1903, issued to William Barber, Brooklyn, N. Y., for a spark plug with an insulator consisting of a combination of porcelain and a less fragile substance, which is the basis for the litigation started by William Barber against the Smith-Haines Co. for selling Sootless plugs and the Lowe Motor Supplies Co. for selling Red Head combination plugs. The above company is interested in the Red Head plug, and since it is one of the owners of the patent the suit against the Lowe Motor Supplies Co., will be discontinued, as the Red Head plug ceases to be an infringement, because of the new interest in the patent.

New Interstate Receiver

INDIANAPOLIS, IND., Oct. 27.—On the involuntary bankruptcy petition filed in the United States Court here by creditors a few days ago, Judge Albert B. Anderson has appointed Rollin Warner receiver for the Interstate Automobile Company of Muncie.

Warner will succeed Michael J. Broderick, who was appointed receiver for the company in the county court at Muncie about 2 weeks ago. Broderick's appointment was opposed on the ground that it was made without consulting any of the larger creditors and that the case should have gone before the United States Court instead of before the county court.

Warner's bond has been fixed at \$25,000, which it is thought he will have no difficulty in giving. The creditors who filed the petition in the United States Court were Margaret Jenks, Port Huron, Mich.; Union Drop Forge Co., Chicago; Merchants Delivery Co., Chicago, and John C. Meyer and Co., Lowell, Mass.

Keystone Grease Gains a Victory

PHILADELPHIA, PA., Oct. 24.—The word Keystone as applied to greases and lubricating oils, belongs to Augustus C. Buzby, doing business as the Keystone Lubricating Co., because of his introduction of his product under that name in 1885. This is the decision of the United States District Court for the Northern District of Illinois. The suit in which the validity of this trade-mark was established was fought between the Keystone Lubricating Co., of Philadelphia, Pa., and the Keystone Oil & Manufacturing Co., of Chicago, Ill. It was the complaint of the former that the Chicago concern had incorporated in 1900 under the name Keystone with the deliberate intention of committing frauds upon the trade, and the court holds that such was the case,

despite the fact that the product of the company was not marked with the trade-mark, nor sold as Keystone grease. The chief witness in the trial was the firm of Hibbard, Spencer & Bartlett, of Chicago, which submitted a bid for a government contract for Keystone grease, and which by mistake called upon the Chicago "Keystone" company for estimates. The order was awarded to the Hibbard concern, but on delivery the fraud was discovered.

In declaring the Chicago Keystone an infringer of the rights of the Pennsylvania company, the court took in consideration the proven fact that a number of garage owners had been misled into buying the wrong Keystone product, finding upon delivery that Banana Grease and similar lubricants had been shipped by the Chicago company. The court thereupon decided that the complainant having a valid trade-mark, the defendant had no right to use the word Keystone in its corporate name, so far as the sale of lubricating grease by it is concerned, if the public is thereby misled. The instances cited show that the similarity of names causes confusion and mistake, and are thought to be sufficient to justify the claim of fraud made by the bill. Defendant does not infringe the trade-mark by marking his goods, but by using the same name to indicate its product. Confusion and mistake result, and this is sufficient to entitle the complainant to the relief prayed.

The court ordered that the Chicago concern should incorporate its lubricating grease business under some other name, or adopt some other plan to avoid infringement.

Bicar Co. to Make Cyclecars

INDIANAPOLIS, IND., Oct. 27.—This city, which has become one of the leading motor car centers of the United States, promises to gain equal distinction in the cyclecar field. Another cyclecar company, the third, has just been organized.

The new company, known as the Bicar Co., has been organized by Chester S. Ricker, recently associated with the Henderson Motor Car Co. The Bicar will be shipped knocked down and the purchaser will be given advantage of the saving in cost. Shipments will be made during the spring according to present plans of the company.

Brown Cyclecar in the Field

ASBURY PARK, N. J., Oct. 27.—The Brown cyclecar has been announced from Asbury Park, N. J. The car is a side-by-side seating vehicle fitted with a twin air-cooled motor, friction-and-chain transmission, and a 44-inch tread. Cable steering is used. The wheelbase is 96 inches and the car complete is to sell for \$375 with top and electric lights. The weight is stated to be under 600 pounds, and the car will be made in Asbury Park.

Electric Vehicle Assn. Holds Most Successful Convention in Its History

CHICAGO, ILL., Oct. 29.—Special Telegram—E. W. Smith, of the United Electric Light & Power Co., New York, was elected president of the Electric Vehicle Assn. of America at the Fourth Annual Convention of this association which concluded its 2-day session tonight. J. F. Gilchrist, of the Commonwealth Edison Co., Chicago, was elected vice-president; Harvey Robinson, of the New York Edison Co., is continued as secretary, and Jay Baker, of the General Vehicle Co., Boston, is treasurer. Directors were elected as follows: Arthur Williams and W. P. Kennedy, of New York; W. G. Bee, Orange, N. J., and C. M. Stannard.

Attendance Was Excellent

The 2-day convention held in Hotel La Salle here, attended by several hundred, including central station heads, manufacturers of electric passenger and commercial cars, and garagemen, was one of the most successful in the history of the association, celebrating, as it is, the fourth birthday of this parent organization. In addition to the convention, the eighteenth floor of the Hotel La Salle was given over to a display of exhibits by manufacturers of electric vehicles and accessories. In addition to professional sessions the 2-day program included a visit to the leading electrical garages in the city, and a beefsteak dinner last evening which was attended by 300 delegates.

Salesmanship was one of the topics of the session and it brought out the necessity of the electric vehicle manufacturer co-operating with the central station interests as well as the electric associations and clubs to attain the best results. George H. Kelly and E. J. Bartlett in their paper on salesmanship told of a campaign with 1,400 central stations for the purpose of getting closer co-operation between them and the vehicle interests and found that but twenty replies were received, the conclusion being that central station interests are deplorably back-

ward in this co-operation work. Not meeting with the required co-operation from the central station people the authors of the paper turned to the Electric Vehicle Association of America, as a source of better co-operation and suggested a plan whereby this co-operation could be obtained. The plan included instructions to all central station people to establish electric vehicle sections; to prepare booklets on charging rates and charging apparatus; to prepare a selling manual on the advantages and applications of electric; to tabulate data on vehicles used as well as providing forms for such tabulation by the companies.

In conclusion the author drew attention to the 228 cities of over 25,000 population in this country and thereby showed the economy of some central organization tabulating these various results for these manufacturers as well as for the 1,400 central station organizations.

Rates and Charging Committee Report

The committee on rates and charging submitted a comprehensive report which contained a variety of data on the central station rates in various cities, garage rates in different localities as well as a number of passenger and commercial vehicles in use in different cities.

Papers were read on the recent development in lead batteries for electric vehicles, on tires for electric and on such industrial subjects as How to Make the Business Healthy; The Electric Vehicle and Department Service; and Past, Present and Future of the Electric Vehicle.

Cameron Once More in the Field

NEW HAVEN, CONN., Oct. 28—The Cameron Mfg. Co. will start building cars in Orange, a suburb of New Haven. It will occupy the old Mathushek Piano Works, into which the machinery of the company has all been moved from Beverley, Mass., where the old factory was situated, and the work of installing has been started. Mr. Cameron heads the company as general manager and chief engineer, C. C. Corlew as the head of the selling organization and C. C. Barlow, F. C. P. Barnes, Howard Adt, A. H. Bennett, Pierrepont B. Foster, are associated with them in the management of the company.

DETROIT, MICH., Oct. 27—S. H. Humphrey, factory manager of the Hupp Motor Car Co., has been appointed manufacturing manager, with jurisdiction over the production in both the American and Canadian factories.

CHICAGO, ILL., Oct. 27—O. J. Woodard, sales manager for the Woods Motor Vehicle Co., has tendered his resignation to take effect on January 1.

Reo To Distribute 60,000 Shares of Truck Company as Dividends

LANSING, MICH., Oct. 29—Sixty thousand shares of the Reo Motor Truck Co.'s stock, par value \$600,000, held by the Reo Motor Car Co. of this city, are to be distributed to the stockholders of the latter. As their names suggest, the two companies are intimately related, but the cutting of a melon in exactly this form had not been generally anticipated. It followed the declaration of a 7 per cent. dividend on the truck stock.

NEW YORK CITY, Oct. 29—The cyclecar will be the subject of the meeting of the Metropolitan section of the S. A. E. tomorrow night. A meeting of the S. A. E. council will be held on the morning of November 12 and on the afternoon of the same day there will be a meeting of the Passenger Car Wheel Division to take up the subject of pneumatic rim standardization, the study of which was begun some time ago.

Dudley Cyclecar Is Planned

MENOMINEE, MICH., Oct. 28—The Dudley Tool Co. of Menominee, Mich., is to place a cyclecar on the market with a 10 horsepower, V-type motor, air-cooled and a planetary-and-V-belt transmission. The wheelbase is 96 inches and the tread 36 inches. The seats will be staggered, or semi-tandem, allowing of a body of streamline form, not too wide to look ungainly, and with little wind resistance. A test car is now on the road, and the firm expects to turn out from 500 to 1,000 cars for the next season, starting production about Jan. 1. The price will be about \$375, and the weight around 400 pounds according to the information given out. The Dudley Tool Co. has ample facilities for producing the cars, including its own drop-forge plant.

Court Makes Chauffeur Responsible

Rules That Owner Cannot Be Held for Negligence of the Chauffeur When Not on Duty

NEW YORK CITY, Oct. 27—A decision of great interest to automobile owners was handed down by Justice Cohalan in the Supreme Court on Saturday, in the case of Davis vs. the Anglo-American Tire Co.

It is held that the owner of an automobile may not be held liable for damages incurred through the negligence of a chauffeur not in performance of his duties, even though the chauffeur in question was operating his employer's car with the employer's knowledge and consent.

The decision is on a motion to set aside a verdict rendered by a jury. Justice Cohalan states that the jury has found a general verdict for defendants, finding specially, 1, that the accident was caused by the negligence of the chauffeur, and 2, that the automobile was being used by the chauffeur and his companions for pleasure purposes.

"The disputed question," holds the court, "involves the knowledge or consent of the master. Even if the chauffeur had the consent of the master, in view of the answer to the second question of the master could not be held liable. In the above case the automobile was being used by the chauffeur with the permission of the master, and while the chauffeur was driving the car, accompanied by others, the plaintiff was injured. Under these circumstances in that case the master was relieved from liability. Motion to set aside the verdict is denied."

Willys Buys Edwards-Knight

NEW YORK, Oct. 29—John North Willys today purchased for the Willys-Overland Co. the Edwards Motor Car Co. of this city, including its Knight license to manufacture sleeve-valve motors and all patents, drawings and factory equipment, stock, etc. The entire assets of the Edward company will be moved to Elyria, O., and located in the Garford plant, which is one of the Willys-Overland factories. Here the two Edwards-Knight models will be manufactured in their present form under the new name of Garford-Knight, and H. J. Edwards, the designer of them, will go with the Willys organization as chief engineer of the Garford factory. The consideration in today's sale is \$1 and other valuable considerations.

The two Garford-Knight models, one a four, which has been on the market all year as an Edwards-Knight, and the other a new six that has been on the roads for several weeks, will be continued in their present form, carrying such characteristics as Knight sleeve-valve motor, wire wheels, worm drive and cantilever rear springs.

The Edwards Motor Car Co. was organized a year ago last February by C. G. Stoddard and H. J. Edwards, both of whom were erstwhile moving spirits in the Dayton-Motor Car Co., builder of Stoddard-Dayton cars. When the Stoddard factory was bought by the United States Motor Co. the former went with this company as a vice-president and the latter as chief engineer. Stoddard and Edwards left the U. S. Motors in February, 1912, and immediately organized the Edwards company and Mr. Edwards set about designing the present four-cylinder Edwards-Knight, the company having secured from Knight & Kilbourne Patents Company the necessary license.

MILWAUKEE, WIS., Oct. 28—The Universal Machinery Co., 1916 St. Paul avenue, Milwaukee, which is known to the motor industry as producer of Progress commercial cars, has engaged in the manufacture of a special line of motors for cyclecars in single and twin types, ranging from 4 to 9 horsepower. Both intake and exhaust are placed in the head of the cylinders. The Universal Machinery Co. is building the Mack motor as a design for cyclecar use exclusively, a friction disk with brackets being provided. A cooling fan driven from the crankshaft pulley is also provided for this class of work. The 7 horsepower twin has cylinders set at a 45 degree angle, with bore of 3.375 and stroke of 3.406 inches, giving a piston displacement of 60.94 cubic inches. The 9 horsepower twin likewise has 45-degree cylinders of 3.375-inch bore and 3.906-inch stroke, giving a piston displacement of 69.90 cubic inches.

Big Demand for Space at New York Show

NEW YORK CITY, Oct. 28—Although it is known that practically every inch of floor space has been allotted to exhibitors for the National Automobile Show to be held in the Grand Central Palace, January 3-10, Manager S. A. Miles has been besieged daily for more space by manufacturers of cars and accessories who are not affiliated with either the Automobile Chamber of Commerce or the Motor and Accessories Manufacturers, Inc. Last week car allotments were made for the New York show to the Allen Motor Co., Cameron Mfg. Co. and the Crescent Motor Co. Mr. Miles expects to receive word soon from the motorcycle manufacturers as to what space they have chosen for the motorcycle section, which this year will surpass any former exhibition. The electric car manufacturers are expected to announce also space allotments of the various companies which will show their product at both the New York and Chicago exhibitions, as soon as they have decided on the basis of production, which is the course of drawing adopted this year.

NEW YORK CITY, Oct. 28—The Sireno Co., Inc., manufacturer of automobile signal horns and accessories, 18 Rose street, this city, has been elected to membership in the Motor and Accessory Manufacturers. At the last meeting of the board of directors, C. W. Stiger, of the Stromberg Motor Devices Co., was elected as a member of the board of directors to succeed W. H. Crosby, resigned, and to serve until January 7, 1914.

New York May Have Automobile Parade

NEW YORK CITY, Oct. 27—A number of owners in Queens County have banded themselves together under committee headed by W. H. Fitzpatrick as chairman, to get up a good roads demonstration, in the form of a motor parade. It will be held on November 1. The Manhattan Automobile Club has stated its intention of getting together as many cars as possible to represent it in the parade.

Lincoln Highway Nearly Marked

DETROIT, MICH., Oct. 28—The route of the Lincoln Highway will be marked, almost without a break, from New York to San Francisco by the night of Friday, October 31, when the dedication celebrations are to be held across the country. Some of the states, particularly in the west, have already completed the work. In many of the cities the route is marked today. In Philadelphia the Philadelphia Trade Association is marking the route from one end of the city to the other. In Omaha all the signs are up as they are in Clinton, Ia., and a dozen other points. The markers are now being placed across the state of Nevada and in Utah, Illinois and other states the work is progressing rapidly. In Nebraska, two-thirds of the old Overland Trail has been marked and the balance will be completed this week.

Chicago Men Head Two Hundred Club

CHICAGO, ILL., Oct. 20—The first meeting of the Two Hundred Club was held recently when E. C. Patterson, founder of the organization, was elected president, W. E. Stalnaker, vice-president, R. O. Evans, treasurer and George F. Ballou, secretary. All are Chicagoans. Thirteen of the forty-one members of the club, which has members in nine states, were present. A change in the rules was made whereby aspirants for membership need give only 2 days' notice of their intention to try to drive 200 miles in 10 hours without a motor stop, while members, trying for additional honors, need give only 12 hours' notice. The headquarters of the organization will be in the Westminster building, Chicago.

El Paso-Phoenix Racer Killed

PHOENIX, ARIZ., Oct. 25—*Special Telegram*—Declaring that he would lower the record from Douglas to Bisbee, the distance of 24 miles, from 30 minutes to 20 minutes, Jack Forrest of El Paso, Tex., driving a Stutz car, entered in the El Paso-Phoenix race, left Douglas late Friday afternoon. While he was going at terrific speed, he struck a gully, washed out by a recent rain, turning the machine over twice and pinning him underneath. He

was instantly killed. His mechanic was badly hurt, but will recover. Mr. Forrest was to have been mechanic for Lew Gasser in the coming race.

Brighton Beach Property Sold

NEW YORK CITY, Oct. 28—The Sheepshead Bay and Plum Island property of the Brighton Beach Racing Assn. was sold on Friday at auction to G. W. Bradish for \$120,000. It was sold at foreclosure on August 28 to William Hudson, but that sale was set aside by Justice Garretson after argument by D. E. Lynch and J. A. Blanchfield.

Bad Weather Mars St. Louis Races

ST. LOUIS, MO., Oct. 28—The wet and slippery track at Maxwellton Fair Grounds, Sunday, caused a slowing up of the big racing cars that came here for a 2-day race meet. The races Saturday were postponed because of rain.

Louis Disbrow in his Jay Eye See and his Simplex Zip gave several exhibitions of driving but did not attempt to break any world's records as he had promised. In a 3-mile handicap event he negotiated the distance in 3:04:37.

What is claimed to be a new record was made when mechanics put a new wheel on a car in :14 1-5, which, the managers say, is 4-5 seconds better than the old mark.

With weather conditions favorable Sunday the races will be resumed.

5 Mile for Car 600 Cu. In.			3-mile Handicap		
CAR	DRIVER	TIME	CAR	DRIVER	TIME
Simplex.....	Disbrow.....	5:32:20	Simplex.....	Disbrow.....	3:04:37
Staver.....	Monkemier		Case.....	Endicott	
Case.....	Endicott		Staver.....	Monkemier	
			Bullet.....	Lheinam	

Commerce Truck To Go Around World

DETROIT, MICH., Oct. 25—A light delivery car is to make a trip around the world. The Commerce Motor Car Co. of this city last week closed the arrangements. J. D. Wilkinson, representing the Smythfield Export Co., Philadelphia, Pa., selected 250 of these trucks, which will be shipped to points to which he specify later. He will carry with him a sample truck throughout the entire trip. He will be gone over 2 years. His object is to dispose of the 250 trucks en route.

INDIANAPOLIS, IND., Oct. 28—Carl G. Fisher, James A. Allison and L. H. Trotter have organized the Speedway Realty Co. to promote Speedway, the horseless city opposite the Indianapolis Motor Speedway, northwest of Indianapolis. The company has been incorporated with an authorized capitalization of \$10,000.

CHICAGO, ILL., Oct. 25—The purchase of the Chicago branch of the Franklin Automobile Co., Syracuse, N. Y., by Frank H. Sanders and that of the Cincinnati branch by Newman Samuels during the past week complete the closing out of the company's branches.

KENOSHA, WIS., Oct. 25—The Thos. B. Jeffery Co. has concluded arrangements with independent interests for taking over the Jeffery branches in Chicago, Milwaukee and San Francisco. Negotiations for similar arrangements with regard to its other branches are now in progress.

State to Pay Damages for Fatal Race

ALBANY, N. Y., Oct. 29—The State of New York must pay the damages resulting from the automobile accident at the Syracuse State Fair in 1911, in which eleven persons were killed and ten injured. So Judge Irving G. Vann, who was appointed referee in the case by the Court of Claims, has decided. The state is responsible because it permitted the race to be held on state property, he held. The state will be forced to pay almost \$25,000 damages. C. Arthur Benjamin, who managed the race, is exonerated.

Factory Miscellany

NOW City of Ford, Ont.—The official recognition of the vast enterprise built up by the Ford Motor Co. of Canada, Limited, has come from the Canadian Government in establishing the village and township of Ford, Ont., together with a post office. This year, which ended on October 31, the Canadian Ford Co. made 15,000 cars, valued at approximately \$7,500,000. The Canadian plant was established in 1905, and the total business that year was \$110,000. In 1912 the sales were \$4,500,000. In addition to the plant here the company maintains eight branches in the large cities of the Dominion and is represented by agents in every town and village in Canada. The town of Ford is situated on the Detroit River, just east of Walkerville.

Kelly Truck Cuts Working Hours.—Working hours at the Springfield Kelly Motor Truck Co., Springfield, O., have been cut from 9 to 5½ hours.

Velie Erecting.—The Velie Motor Vehicle Co., Moline, Ill., is erecting an addition to its plant, which will have 12,000 square feet of floor space.

Adds Repair Shop.—The National Auto Maintenance Co., Chicago, Ill., recently leased a building which will be equipped as an automobile and engine repair shop.

Chester Rubber Tire to Build.—The Chester Rubber and Tube Works, Chester, Pa., has awarded the contracts for the erection of its plant in that city. The company has a capital of \$250,000.

Looking for Site.—The Blodgett Rubber Co., of Chicago, Ill., is looking for a site near Jeannette, Pa., for the erection of a \$100,000 plant which will manufacture inner tubes and a large variety of rubber goods.

Spenney Car Co. Builds.—The Spenney Motor Car Co. will establish a plant at Holland, Mich. A building has been secured, and the equipment is now being purchased. The capital stock of the company is \$500,000.

Packard Adds to N. Y. Plant.—The Packard Motor Co. plans to erect a one-story addition to its plant in New York City. It is to be of brick and concrete construction, 80 by 227 feet. The estimated cost is \$40,000.

Savage Tire Plant Closes.—The Savage tire plant at San Diego, Cal., was closed down 3 days, recently, and barely missed being destroyed by fire which consumed the Standard Oil Co.'s plant.

Will Manufacture Automobile Appliances.—The National Drawn Steel Co., manufacturer of drawn steel products, including automobile appliances, gas engines, etc., will be in operation in East Liverpool, O., within 3 months. The company is capitalized at \$100,000.

Kissel Adds 500 Horsepower.—The Kissel Motor Car Co., Hartford, Wis., is adding about 500 horsepower to the power-generating plant at the main works in that city, making a total generative capacity of nearly 1,500 horsepower.

Looking Over Waterloo Ground.—Two representatives from the Continental Motor Truck Co., of Denver, Colo., recently arrived in Waterloo, Ia., and in company with a number of the members of the local commercial bodies made a tour of the city with a view to locating a branch factory in that city.

Moody Looking for Site.—C. W. Moody, who holds a controlling interest

in the Standard Motor Truck Co., of Cleveland, desires a new location and is looking for a site in Warren, O. The lease on the present plant expires soon and it is desired to move to a smaller place. The concern is capitalized at \$20,000.

Schoch Will Erect.—H. R. Schoch, Philadelphia, Pa., is planning to erect a plant at Hunting Park Ave. and Stokeley Street, for the manufacture of automobiles. The new structure will be of reinforced concrete and fireproof throughout, 270 by 340 feet, four stories and a basement. The estimated cost is \$100,000.

New Factory for Champion.—A permit has been granted for the erection of a new factory building for the Champion Spark Plug Co., at Avondale and Upton avenues, Toledo, O., to cost \$50,000. The building will be four stories, concrete, with steel sash and daylight effects and will have a ground space of 60 by 120 feet.

Ohio Carriage Factory Burns.—Fire recently almost totally destroyed the contents of the five-story brick factory of the Ohio Automobile Carriage Co., Cleveland, O., causing a loss of \$50,000. The chief loss was in automobile bodies and machinery for construction. The explosion of a can of varnish on the ground floor is believed to have started the fire.

Evans' New Plant.—The new plant of the Evans Motor Car Co., Nashville, Tenn., will be built on the eastern banks of the Cumberland River. This concern will build automobiles and motor trucks. The new plant will give employment to between 500 and 600 skilled mechanics. The plans call for the erection of three concrete buildings, each 50 by 300 ft., to be enclosed with glass sides, affording plenty of light and ventilation.

Paige-Detroit Has Grown.—September 28, 1913, marked the completion of 4 years of hard work and remarkable growth of the Paige-Detroit Motor Car Co., Detroit, Mich. From an 800-car output, the development has been steady, necessitating a new factory with an output for 1914 of 13,500 cars. On December 1, the company will occupy its new building at Fort and McKinstry streets, which is one of the largest automobile factories in the country.

Middleby Plant to Go.—The sale of the plant of the Middleby Auto Co., Reading, Pa., will take place on October 30 at the plant. The property listed for sale includes 1.16 2-3 acres of real estate, ten automobiles, 478 separate lots of late type high speed automatic machine tools and other machinery and mechanical equipment. There is also a large lot of finished and unfinished parts for the Reading Forty automobile. The realty is made up of two parcels on which are substantial brick buildings, electrically operated and electrically lighted. The buildings form together a street frontage of 360 feet, 50 feet deep.

The Automobile Calendar

Shows, Conventions, Etc.

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| Nov. 8-15..... | Atlanta, Ga., Show, Atlanta Automobile & Accessory Assn. |
| Dec. 9-10-11-12.... | Philadelphia, Pa., Fourth American Road Congress, First Regiment Armory. |
| Dec. 9-12..... | Philadelphia, Pa., Annual Convention of American Road Builders' Association. |
| Dec. 11-20..... | New York City, First International Exposition of Safety and Sanitation, under the auspices of the American Museum of Safety. |
| Jan. 2-10, 1914.... | New York City, Importers' Automobile Show, Hotel Astor. |
| Jan. 3-10, 1914.... | New York City, Automobile Show, Grand Central Palace. |
| Jan. 10-16..... | Milwaukee, Wis., Sixth Annual Show, Auditorium, Milwaukee Automobile Dealers' Assn. |
| Jan. 24-31, 1914.... | Chicago, Ill., Automobile Show, Coliseum and First Regiment Armory. |
| Jan. 26-31, 1914.... | Scranton, Pa., Automobile Show, Automobile Assn. of Scranton. |
| Jan. 10..... | Cleveland, O., Show, Cleveland Auto Show Co. |
| Jan. 12-17..... | Bridgeport, Conn., Annual Automobile Show, State Armory, B. B. Steiber, manager. |
| Jan. 31-Feb. 7, 1914 | Minneapolis, Minn., Automobile Show. |
| Feb. 2-7..... | Buffalo, N. Y., Automobile Show, Buffalo Automobile Dealers' Assn. |
| Feb. 9-14..... | Buffalo, N. Y., Truck Show, Buffalo Automobile Dealers' Assn. |
| Feb. 16-21..... | Kansas City, Mo., Auto Show. |
| Feb. 21-28..... | Newark, N. J., Automobile Show, N. J. Auto Trade Assn. |
| Feb. 22-March 5.... | Cincinnati, O., Automobile Show, Cincinnati Automobile Dealers' Assn. |
| Feb. 23-28..... | Omaha, Neb., Automobile Show, Omaha Automobile Assn. |
| Mar. 2-6..... | Fort Dodge, Ia., Show, Fort Dodge Auto Dealers' Assn. |
| Mar. 7-14..... | Boston, Mass., Automobile Show. |
| Mar. 9-14..... | Des Moines, Ia., Show, Des Moines Automobile Dealers' Assn. |
| March 17-21..... | Boston, Mass., Truck Show. |

Race Meets, Runs, Hill Climbs, Etc.

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| Nov. 1..... | Hot Springs, Ark., Track Race, J. A. Sloan. |
| Nov. 3..... | Los Angeles, Cal., Road Race to Phoenix, Ariz. |
| Nov. 4..... | El Paso, Phoenix Road Race, Maricopa Auto Club. |
| Nov. 6..... | Phoenix, Ariz., Track Meeting, State Fair. |
| Nov. 7-8..... | Philadelphia, Pa., Economy Run, Quaker City Motor Club. |
| Nov. 9-12..... | Shreveport, La., Track Race, J. A. Sloan. |

Foreign

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| Nov. 7-15..... | London, Eng., Annual Automobile Exhibition, Olympia. |
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The Week in the Industry

Motor Men in New Roles

NEW Moon Additions.—The Moon M. C. Co., St. Louis, Mo., has appointed J. A. O'Brien to look after northern Iowa and Minnesota. W. K. Ellis of Des Moines, Ia., has the rest of Iowa, Nebraska and the Dakotas. The States of Illinois and Kentucky have been turned over for the attention of L. R. Collins, and Missouri and Kansas will have the attention of G. E. Bonney.

Will Bring Out Cyclecars.—J. P. Cormick, of Detroit, Mich., is preparing to bring out a cyclecar as is also H. P. Hart.

Case Lyons Assistant Manager.—E. H. Case has been appointed assistant sales manager of the Lyons Atlas Co., of Indianapolis, Ind.

Wadleigh Succeeds Young.—Corliss Wadleigh has succeeded C. A. Young as manager of the fire apparatus department of the Knox branch in Boston, Mass.

Cully Leaves Swinehart.—J. W. Cully, manager of the Detroit, Mich., factory branch of the Swinehart Tire & Rubber Co., of Akron, O., has resigned his position.

Lininger Keeton Sales Representative.—W. Lininger has been appointed sales representative of the Keeton Motor Car Co., Detroit, Mich., for the Michigan territory.

Brewster Resigns.—C. S. Brewster, Philadelphia, Pa., representative for the Stewart-Warner Speedometer Corp., of that city, has severed his connection with that company.

Reynolds Seldon Sales Manager.—The Seldon Truck Sales Co., Rochester, N. Y., distributor of the Selden truck, has appointed W. F. Reynolds, as district sales manager.

Martin Heads Kansas City Assn.—J. F. Martin, Kansas City, Mo., manager of the Buick branch, will head the Kansas City Motor Car Dealers' Assn. during the following year.

Menasco Heads American Motors.—D. S. Menasco was elected president of the American Motors California Co., Los Angeles, Cal., at the election of officers of that company held recently.

Barrier with Lyons.—B. J. Barrier, formerly with the Pullman Motor Co., is now with the Lyons Atlas Co., Indianapolis, Ind. He is traveling in the Middle West establishing agencies.

Beidler Manager.—W. H. Beidler, who for the last 2 years has been with the Don Lee organization in San Francisco, Cal., has been named manager of the Sacramento branch of this company.

Hoffman Dies in Fire.—C. R. Hoffman, general manager of the Lindhe Shim Co., 210 Canal street, New York City, lost his life in a fire that destroyed the building it was located in, on October 24.

Dowse Changes Territory.—R. P.

Dowse, recently with the Detroit, Mich., branch of the Goodyear Tire & Rubber Co., has been transferred to the territory east of Buffalo, N. Y. He is at present a factory representative working from Akron, O.

Hawkins Much Improved.—N. A. Hawkins, commercial manager of the Ford Motor Co., Detroit, Mich., who has been dangerously ill for a long time, was reported recently as so much improved that he had been allowed to sit up for short periods.

Stephen Bull Critically Ill.—Stephen Bull, Sr., one of the four which established the industries now known as the J. I. Case T. M. Co., of Racine, Wis., is critically ill at his home in Racine and because of his advanced age, 89 years, little hope is held out for his recovery. The other members have long since passed away.

Join Packard Forces.—Harry Ludwig, formerly manager of the Providence, R. I., branch of the Fiat, and before that with the Corbin Co. at Bridgeport, Conn., has been made sales manager of the Providence branch of the Boston Packard Co. C. W. Phinney, formerly with the Thomas and Alco forces in Boston has joined the sales force of the Boston Packard agency.

Splitdorf Changes.—Important executive changes have been made in the recent process of incorporation of the Splitdorf Electrical Co. branch houses. The Splitdorf Electrical Co., Detroit, Mich., is now incorporated with C. E. Brelsford as president, H. J. Hinley as treasurer and manager and W. J. Murray as secretary. The Chicago branch is incorporated with R. S. Preble as president and manager and E. A. Kelley as secretary and treasurer.

Overland Promotions.—The announcement is made of the promotion of several in the sales department of the Willys-Overland Co., Toledo, O. T. J. Edwards, formerly clerk of the courts of Allen County, O., has been placed in charge of the Chicago, Ill., branch of the Garford department of the company with thirty men in his territory. F. E. Gooding has been made assistant manager in the truck sales department and will sell the Willys Utility, the Garford, and the Overland delivery wagon.

Garage and Dealers Field

Boston Equipment Co. Moves.—The American Motor Equipment Co., 27 Haverhill street, Boston, Mass., has moved to 69-73 Washington street.

Appointed Ajax Toronto Agent.—The Progressive Tire Co., Ltd., Toronto, Ont., has been appointed as Canadian representatives of the Ajax tire with headquarters at 137 Church street.

Firestone Service Station for Trucks.—The Firestone Tire Co. has built a service station for trucks at West End avenue and 63rd street, New York City.

It is six stories high and completely equipped.

Moves Accessory Shop.—Fred Campbell, St. Louis, Mo., accessory dealer, moved into his new quarters this week. The building, which is a five-story structure with all the modern conveniences, is at 1109 Locust street.

Opens Detroit Turntable Office.—The T. C. Beach Auto Turntable Co., St. Johns, Mich., maker of motor vehicle turntables for public and private garages, has opened a Detroit, Mich., office at 870 Woodward avenue.

By Way of Correction.—In the department of THE AUTOMOBILE of October 9, containing the new agencies, it was stated that the James Gould Co., Albany, N. Y., was agent for the Stegeman truck. This was an error.

U. S. L. Agency Removes.—The U. S. Light & Heating Co. will remove its New England sales office, formerly located at 84 State street, to 25 Irvington street, Boston, Mass. This change brings the service station and sales office under one roof.

Firestone Opens Rochester Branch.—The Firestone Tire and Rubber Co., has opened a branch in Rochester, N. Y., in the store formerly occupied by the Seldon Motor Car Co., 223 East avenue. A service station has been established. F. T. Bailey is manager.

Dealers Have an Outing.—The annual fall outing of the Boston Automobile Dealers' Assn. was held last week at the Belmont Springs Country Club and it was attended by about seventy-five members and guests. President J. H. MacAlman presided and addresses were made by many of those present.

Franklin In New Quarters.—The Franklin Motor Car Co., Boston, Mass., is now settled in its new quarters at 616 Commonwealth avenue. The building affords ample room for both salesroom and repair shop, the salesroom being formerly located at 713 Boylston street and the repair shop at 31 Irvington street.

Talk to New England Dealers.—Pres. Henry M. Jewett and Sales Manager Krohn of the Paige Motor Car Co., made a special trip to Boston, Mass., last week where they met all the New England dealers at a luncheon and discussed the outlook for the 1914 season, getting some good ideas from the men handling the line as to the prospects for sales in the New England territory the coming season.

Commerce Truck's Long Trip.—An American light delivery car is to make a trip around the world. The Commerce Motor Car Co., of Detroit, Mich., recently closed the arrangements. J. D. Wilkinson representing the Smythfield Export Co., Philadelphia, Pa., selected 250 of these trucks, which will be shipped to points specified later. He will carry with him a sample truck throughout the entire trip. He will be gone over 2 years. His object is to dispose of the 250 trucks en route.

Recent Incorporations in the Automobile Field

AUTOMOBILES AND PARTS

BOSTON, MASS.—Palmer & Singer Motor Co., capital \$25,000; to deal in automobiles. Incorporators: E. A. McGrath, J. M. Hurley, C. A. Hurley.

BROCKTON, MASS.—White Automobile Co.; capital, \$30,000; to deal in automobiles. Incorporators: R. Litchfield, S. H. Freedman, P. H. Simons.

BUFFALO, N. Y.—Autocrat Mfg. Co.; capital, \$50,000; to manufacture motor cycles, side cars, etc. Incorporators: F. Maytham, F. S. Mott, A. W. Blumley.

BUFFALO, N. Y.—D. H. Stoll Co.; to take over the press, shear, die and special metal working machinery business conducted in the past by D. H. Stoll Co. under the same name. Incorporators: D. H. Stoll, R. J. MacKenzie, K. B. MacDonald.

CHICAGO, ILL.—Garford Motor Car Co.; capital, \$10,000; to deal in automobiles. Incorporators: T. J. Edwards, C. W. Price, B. L. Moore.

CINCINNATI, O.—Central Auto Repairs Co.; capital, \$30,000; to repair automobiles. Incorporators: G. F. Oster, P. V. Connolly, Samuel Stern.

CLEVELAND, O.—Sterling Spring Co.; capital, \$150,000; to manufacture and deal in automobile springs. Incorporators: F. C. Wood, E. D. Linder-smith, D. P. Osborne, H. F. Ehlert, J. A. Flajole.

CHICAGO, ILL.—National Auto Maintenance Co.; capital, \$2,500; to deal in automobiles. Incorporators: J. F. Kelley, R. G. Melcher, C. N. Addis.

DETROIT, MICH.—Sterling-Detroit Motor Co.; capital \$105,000; to manufacture automobiles. Incorporators: H. Little, E. Finkensteadt.

DETROIT, MICH.—Detroit Cyclecar Co.; capital, \$250,000; to manufacture cyclecars. Incorporators: A. R. Thomas, F. L. Hall, P. H. Cale.

HAMILTON, ONT.—Hamilton Taxicabs & Garage, Ltd.; capital, \$40,000; to manufacture and repair automobiles. Incorporators: D. M. Sorenson, H. J. Davison.

INDEPENDENCE, KANS.—Cushing Gasoline Co.; capital, \$1,000; to deal in automobile fuel. Incorporators: R. B. Jones, C. F. Hillman, F. Brown.

INDIANAPOLIS, IND.—Briskin-Wolsiffer Co.; capital, \$10,000; to manufacture motor car parts and accessories. Incorporators: J. H. Briskin, H. W. Bullock, C. C. Wolsiffer.

LACROSSE, WIS.—Chicago Steel Tape Co.; capital,

\$10,000; to manufacture tools, machines and appliances for engineers, architects and surveyors. Incorporator: W. S. Woods.

MARSHFIELD, WIS.—Augustyn Rotary Valve Engine Co.; capital, \$10,000; to manufacture a new type of rotary valve engine of the internal combustion classification. Incorporators: R. J. Strauss, G. E. Harrington, H. E. Hoerl.

MONTCLAIR, N. J.—North End Garage; capital, \$50,000; to repair automobiles. Incorporators: C. P. Kobler, M. Kobler, E. Willis.

NEWARK, N. J.—Essex Motors Mfg. Co.; capital, \$100,000; to manufacture motors, machinery, supplies, etc. Incorporators: W. H. Simpson, M. E. Hudden, J. J. Coyle.

NEW YORK CITY—Weiss & Kronenberg; capital, \$10,000; to deal in automobiles. Incorporators: Chas. Weiss, Harry Kronenberg, Mollie Weiss, Bertha Kronenberg.

NEW YORK CITY—Greater New York Auto Trucking Co.; capital, \$10,000; to do general trucking business. Incorporators: Leo Lang, Lena Lang, Joe Yokel, Bertha Yokel.

NEW YORK CITY—Schildwachter Automobile Co.; capital, \$30,000; to deal in automobiles. Incorporators: Augustus Linden, C. W. Schildwachter, C. G. Schildwachter.

PERKIOMEN, PA.—Oakbrook Motor Mfg. Co.; capital, \$250,000; to manufacture automobile motors.

QUOGUE, N. Y.—Diamond-Warren Motor Co.; capital, \$8,000; to deal in automobiles. Incorporators: J. R. Dimond, A. C. Warren, Thomas Dimond.

ST. JOSEPH, MO.—Grand Center Motor Car Co.; capital, \$5,000; to deal in automobiles. Incorporators: W. J. Hendler, H. R. Lewis, Louis Seigel.

GARAGES AND ACCESSORIES

BROOKLYN, N. Y.—Coney Island Garage Co.; capital, \$500; to do general garage business. Incorporators: W. J. Kelsey, Arthur Wulder, F. Meyer.

BROOKLYN, N. Y.—Utility Garage Co.; capital, \$6,000; general garage business. Incorporators: W. H. Rice, S. E. Miller, H. M. Rice.

CLEVELAND, O.—Mutual Motor Stores Co.; capital, \$50,000; to deal in all kinds of motor supplies. Incorporators: E. M. Goldring, M. West, C. F. Taplin, A. C. Waid, L. H. Stade.

INDIANAPOLIS, IND.—Speedway Realty Co.; capi-

tal, \$10,000; to promote speedway. Incorporators: C. G. Fisher, J. A. Allison, L. H. Trotter.

MILWAUKEE, WIS.—Robinson Auto Heater Co.; capital, \$10,000; to manufacture a device for heating closed cars. Incorporators: J. W. Robinson, H. L. Kellogg.

MILWAUKEE, WIS.—Loop Nut Co.; capital, \$25,000; to manufacture loop nuts and machinery. Incorporators: Radcliffe Denniston, G. H. Owen, L. S. Pease.

NEW YORK CITY—C. & P. Kerosene Carburetor Co.; capital, \$100,000; to manufacture and deal in mechanical devices. Incorporators: L. F. Pelletier, E. F. Ciglia, Holding Anderson.

NEW YORK CITY—Flexible Rim-Tire Co.; capital, \$25,000; to manufacture patented tires for motor vehicles, etc. Incorporators: C. Elmer Clapp, E. G. Ofeldt, A. H. Faveur.

NEW YORK CITY—Detroit Tire & Rubber Co.; capital, \$2,000; to deal in automobile tires. Incorporators: R. Henschel, W. A. Wellman, R. F. Potter.

NEW YORK CITY—American Motorists' Protective Corp.; capital, \$250,000; to protect automobiles and drivers. Incorporators: H. C. Reed, H. L. Sharp, Has. Reilly.

NEW YORK CITY—Marathon Tire Sales Co.; capital, \$1,000; to deal in automobile tires. Incorporators: Owen Moynihan, J. Brewster, R. M. Farries.

OKLAHOMA CITY, OKLA.—Golden Gasoline Co.; capital, \$30,000; to deal in automobile fuel. Incorporators: H. E. Kelly, E. A. Butt, W. B. Tate, N. S. Riley, C. R. Bennett.

OKMULGEE, OKLA.—Transcontinental Garage Co.; capital, \$5,000; general garage business. Incorporators: L. G. Bradfield, C. R. Gill, A. J. Gill.

WASHINGTON, D. C.—Miller's Inner Tire Core Co.; capital, \$260,000; to manufacture and deal in Miller's inner tire core for automobiles.

CHANGES OF NAME AND CAPITAL

CHICAGO, ILL.—Benjamin-Sellar Mfg. Co.; capital increased from \$20,000 to \$30,000.

CLEVELAND, O.—A. R. Davis Motor Co.; capital increased from \$10,000 to \$50,000.

NEW YORK CITY—Republic Motor Co.; change of name to the Chevrolet Motor Co. of New York, Inc.

New Agencies Established During the Week

PASSENGER VEHICLES

Place	Car	Agent	Place	Car	Agent
Abbeville, La.	Oakland	Sampson Chauvin.	Burlington, Vt.	Kisselkar	Geo. A. Collison.
Adams, Minn.	Kisselkar	J. H. Carey.	Bushnell, Ill.	Oakland	Ball Bros.
Amboy, Ill.	Moon	Edmund Neville.	Cairo, Ill.	Regal	Cairo Auto Co.
Ashland, Ky.	Chevrolet	Wellman M. C. Co.	Canon City, Colo.	Moon	J. J. Armstrong & Son.
Atlanta, Ga.	Chevrolet	Johnson M. C. Co.	Carrollton, Ill.	Oakland	C. K. Rafferty.
Auckland, N. Z.	Kisselkar	D. S. C. Cousins & Cousins.	Carthage, Mo.	Chevrolet	Lampher Carriage & Auto Co.
Augusta, Ga.	Marion	L. C. Edelblut.	Cedar Rapids, Ia.	Moon	R. A. Winslow.
Aurora, Ill.	Kisselkar	Geo. A. Arnold.	Chicago, Ill.	Garford	Garford Motor Car Co.
Austin, Tex.	Moon	Abadie's Garage.	Chicago, Ill.	Pullman	J. L. Russell.
Bartlesville, Okla.	Moon	Cherokee M. C. Co.	Claremont, N. H.	Kisselkar	Jewett's Garage.
Batavia, Ill.	Chevrolet	L. F. Wentzel.	Clarinda, Ia.	Kisselkar	G. W. Koons.
Bayside, L. I., N. Y.	Kisselkar	Geo. W. Henschel.	Claysville, Pa.	Chevrolet	G. B. Sprowls.
Beaver Dam, Wis.	Kisselkar	Geo. Beichl.	Cleveland, O.	Chevrolet	Hamilton M. C. Co.
Bellville, Ill.	Jackson	Monk Implement Co.	Cleveland, O.	Pullman	M. C. Coate.
Beloxi, Miss.	Oakland	Hart Chinn.	Clyde, Kans.	Kisselkar	S. H. Knapp.
Big Flats, N. Y.	Chevrolet	W. E. Markle.	Coldwater, Mich.	Chevrolet	Reed & Johnson.
Bloomington, Ill.	Moon	H. P. Patton & Son.	Columbus, Wis.	Kisselkar	Frank Schmied.
Bloomington, Ill.	Oakland	E. H. Preston.	Columbus, O.	Marathon	Pausch-Selbach Wagon & Automobile Co.
Boonville, Mo.	Kisselkar	A. H. Stephens.	Columbus City, Ia.	Moon	H. L. Duncan.
Bradford, Pa.	Pullman	H. E. Camp.	Columbus, O.	Westcott	F. W. Craighead.
Bristol, Tenn.	Chevrolet	O. W. Heatwole.	Corinth, Miss.	Oakland	J. E. Haynes.
Brookfield, M. O.	Kisselkar	Dickenson Auto Co.	Crestline, O.	Hudson	Kroegel & Parsel.
Brookhaven, Miss.	Oakland	Hiram Casseday.	Crowley, La.	Oakland	Thompson-Reiber Co.
Broussard, La.	Oakland	Broussard Hardware & Implement Co.	Decatur, Neb.	Kisselkar	E. A. Hansen.
Buffalo, N. Y.	Chevrolet	Joe Rath.	Denver, Colo.	Chevrolet	C. T. Maines.
Buffalo, N. Y.	Pullman	Meyer M. C. Co.			

New Agencies Established During the Week

PASSENGER VEHICLES

Place	Car	Agent	Place	Car	Agent
Dallas, Tex.	Chevrolet	Southwestern Motor Sales Co.	New York City.....	Oakland	M. J. Smith.
Des Moines, Ia.	Chevrolet	W. A. Oldfield.	New York City.....	Chevrolet	Republic Motor Co.
Dover, N. H.	Chevrolet	F. F. Wentworth.	New York City.....	Marion	American-Marion Sales Co.
Drew, Miss.	Oakland	J. B. Ratliff.	Norfolk, Va.	Chevrolet	Roethke-Carver Co.
DuQuoin, Ill.	Moon	Our Garage.	Oakland, Neb.	Kisselkar	Irving Kerl.
East Orange, N. J.	Chevrolet	J. W. Ward.	Oak Ridge, La.	Oakland	Dr. C. L. Hope.
Edmonton, B. Col.	Kisselkar	Imperial Garage Co.	Ocala, Fla.	Marion	B. F. Condon.
El Paso, Tex.	Kisselkar	Longwell Auto Sales Co.	Okmulgee, Okla.	Kisselkar	J. Lyons.
Everist, Kans.	Kisselkar	E. V. Hargies.	Olmitz, Kans.	Kisselkar	Tom Pizinger.
Fall River, Mass.	Chevrolet	Watuppa Auto Co.	Omaha, Neb.	Chevrolet	Doty & Hathaway.
Flint, Mich.	Chevrolet	James Parkhill.	Oreonta, N. Y.	Pullman	L. G. Osborn & Co.
Fort Smith, Ark.	Oakland	J. B. Williams.	Orebro, Sweden	Pullman	Johan Behrn.
Fountain Green, Ill.	Oakland	S. H. Tyler.	Orlando, Fla.	Chevrolet	I. W. Phillips & Sons.
Fresno, Cal.	Kisselkar	Cobb-Evans Auto Co.	Ottawa, Ont.	Oakland	Ray Motor Co.
Fullerton, Cal.	Kisselkar	Wickersheim Implement Co.	Owen Sound, Ont.	Oakland	Owen Sound Garage.
Galveston, Tex.	Kisselkar	Orlander Sales Co.	Owosso, Mich.	Oakland	H. B. Harder.
Garden City, L. I.	Chevrolet	Garden City Garage.	Pigeon, Mich.	Oakland	Phillips & Taylor.
Georgetown, Del.	Oakland	Georgetown Garage & Supply Co.	Pine Bluff, Ark.	Kisselkar	Dille Eng. Co.
Grand Rapids, Mich.	Chevrolet	Metz Garage.	Pittsburg, Pa.	Marion	Pullman Auto Co.
Grand Rapids, Mich.	Kisselkar	Oswald Hess Co.	Poughkeepsie, N. Y.	Kisselkar	E. B. Delamater.
Grand Rapids, Mich.	Oakland	G. P. Dowling.	Prince Albert, Sask. Can.	Chevrolet	Owners Garage Co., Ltd.
Greenport, L. I., N. Y.	Kisselkar	Aleck Zaves.	Quincy, Ill.	Chevrolet	Gem City Auto Exchange.
Greenville, Miss.	Oakland	E. C. Berry.	Richmond, Va.	Palmer-Singer	W. W. Shields.
Greenville, S. C.	Chevrolet	Ellis Car Co.	Rio Vista, Cal.	Kisselkar	L. H. Church & Co.
Grenada, Miss.	Oakland	King & Miers.	Rochester, N. Y.	Pullman	Genesee Motor Veh. Co.
Hamilton, O.	Chevrolet	West Side Motor Co.	Rockaway Beach, L. I.	Kisselkar	I. C. Newman.
Hattiesburg, Miss.	Oakland	Riley Poykin.	Rockville Centre, L. I.	ole	Gardner Garage & Motor Car
Haverhill, Mass.	Kisselkar	A. H. Amazeen.	Rutland, Vt.	Chevrolet	T. J. Bryne.
Herman, Neb.	Kisselkar	E. P. Handen.	Salina, Kans.	Kisselkar	E. H. Sudendorf.
Heuvelton, N. Y.	Chevrolet	G. Breckenridge & Son.	Salt Lake City, Utah.	Pullman	J. P. Fowler Mfg. Co.
Hibbing, Minn.	Kisselkar	J. Maki.	San Antonio, Tex.	Chevrolet	Knight M. C. Co.
Hilliards, O.	Buick	Leroy Dobyns.	San Diego, Cal.	Kisselkar	Davies-Leavitt Co.
Hilliards, O.	Hudson	Leroy Dobyns.	Sanford, Me.	Chevrolet	Morse & Carll.
Hot Springs, Ark.	Oakland	Crawford & Shelton.	San Francisco, Cal.	Marion	American Motors Cal. Co.
Indianapolis, Ind.	Chevrolet	Wm. Small Co.	Sapulpa, Okla.	Kisselkar	W. E. Brown.
Indian River, Mich.	Oakland	C. A. Campbell.	Shelby, Miss.	Oakland	L. B. Wilkinson.
Jackson, Tenn.	Oakland	Dixie Garage.	Sheridan, Wyo.	Kisselkar	R. C. Tarrant.
Jacksonville, Fla.	Chevrolet	F. E. Gilbert Co.	Sioux Falls, S. D.	Marion	Van Brunt-Bleg Co.
Kansas City, Mo.	Chevrolet	Southwest Motor Co.	Slayton, Minn.	Kisselkar	Harrington Auto Co.
Keene, N. H.	Kisselkar	Robertson & Bennett.	St. Augustine, Ill.	Moon	Sherman Babbitt.
Kewanee, Ill.	Moon	Larson & Lundberg.	St. Johnsbury, Vt.	Kisselkar	C. E. Silsby.
Lake Charles, La.	Oakland	Calcasien Motor Car Co.	St. Joseph, Mich.	Chevrolet	Goodell & Kolberg.
Lake City, Minn.	Kisselkar	Grogan & Ritschen.	St. Charles, Mo.	Jackson	Ringe & Barklage.
Lebanon, Pa.	Chevrolet	E. M. Hottenstein.	St. Louis, Mo.	Chevrolet	Kardell M. C. Co.
Leetsdale, Pa.	Moon	F. G. Mohn.	St. Louis, Mo.	Marathon	Lindell Auto Sales Co.
Lewiston, Me.	Chevrolet	Wade & Dunton.	Springfield, Mass.	Chevrolet	Bunker & Reopelle.
Lexington, Miss.	Oakland	L. E. Barr.	Staunton, Va.	Chevrolet	J. H. Shultz.
Litchfield, Minn.	Kisselkar	W. A. Berens.	Stephens City, Va.	Chevrolet	S. B. Grove.
Little Rock, Ark.	Detroit	Henry Leigh & Co.	Strasburg, Pa.	Marion	Carroll Motor Car Co.
Logan, O.	Hudson	Gage Auto Co.	Suffolk, Va.	Chevrolet	American Garage & Timer Co.
Logansport, Ind.	Chevrolet	G. Caruso & Co.	Sumner, Miss.	Oakland	Sumner Motor Car Co.
Macon, Miss.	Oakland	W. W. Shannon.	Sumner Hill, Ill.	Regal	W. H. Barrington.
Manchester, N. H.	Reo	Prodie Electric & Auto Co.	Tampa, Fla.	Chevrolet	West Coast Auto Co.
Mankato, Minn.	Cole	Harry H. Perrin.	Toledo, O.	Chevrolet	Funnell Auto Sales Co.
Mankato, Minn.	Kisselkar	C. W. Eckman.	Toronto, Ont.	Pullman	Todd's Garage.
Marietta, O.	Cole	J. Katentein.	Trenton, N. J.	Kisselkar	John H. Ashton.
Marietta, Ga.	Chevrolet	C. W. DuPre.	Tullula, La.	Oakland	W. M. Scott, Jr.
Marion, O.	Hudson	C. C. Stoltz.	Tupelo, Miss.	Oakland	E. C. Hinds.
Marion, Ill.	Moon	Perry & Guill.	Tucson, Ariz.	Moon	R. H. Delno.
Marshfield, Ore.	Cole	Nelson Iron Works.	Tyler, Tex.	Kisselkar	W. G. Goodman.
Marquette, Mich.	Chevrolet	Cloverland Auto Co.	Utica, N. Y.	Marion	Central Auto Sales Co.
Massillon, O.	Kisselkar	Massillon M. C. Co.	Vacaville, Cal.	Kisselkar	E. H. McMillan.
Mayestown, Ill.	Jackson	G. C. H. Bellmeir.	Virginia City, Mont.	Kisselkar	Buford Auto Co.
Mazon, Ill.	Marion	Clarence B. Water.	Walhalla, N. Dak.	Kisselkar	Delisle & Stack.
McMinnville, Ore.	Cole	A. S. Dixon.	Washington, D. C.	Chevrolet	Henderson M. C. Co.
Medicine Hat, Can.	Cole	Jas. T. Berry.	Washington, D. C.	Jeffery	Moore & Jamison.
Memphis, Tenn.	Oakland	Premier Sales Co.	Waterbury, Conn.	Chevrolet	R. W. Tyrell.
Menasha, Wis.	Kisselkar	Menasha Motor Car Co.	Waterloo, Ia.	Chevrolet	Miller Auto Co.
Meridian, Miss.	Oakland	W. H. Florentine.	Water Valley, Miss.	Oakland	W. T. Trusty.
Milwaukee, Wis.	Chevrolet	Wis. Auto Sales Co.	Waukesha, Wis.	Ford	Spinner, Wolf & Evans.
Milwaukee, Wis.	Marathon	J. A. Smith Auto Co.	White Plains, N. Y.	Kisselkar	H. Ross Clark.
Minneapolis, Minn.	Chevrolet	Minnesota M. C. Co.	Wichita, Kans.	Marion	Karl Mosbacher.
Minneapolis, Minn.	Auburn	Northwestern Auto Co.	Wilmington, Del.	Kisselkar	White Bros.
Minneapolis, Minn.	Marathon	La Crosse Auto Co.	Windom, Minn.	Kisselkar	D. U. Weld.
Minneapolis, Minn.	Marion	Bowman & Libby.	Winona, Miss.	Oakland	E. B. Smith.
Montgomery, Ala.	Chevrolet	Montgomery Carriage Works Co.	Worcester, Mass.	Chevrolet	F. S. Howard.
Monticello, Ind.	Chevrolet	Frank Andrews.	Worcester, Mass.	Pullman	Peter Welin.
Montreal, Que.	Chandler	Major Auto Co., Ltd.	Yankton, S. Dak.	Kisselkar	Sid. O. Hanger.
Montreal, Que.	Pullman	E. N. Herbert.	Youngstown, O.	Pullman	Interstate Auto. Co.
Montreal, Que.	Sunbeam	Peerless Motor Co., Ltd.			
Morris, Minn.	Kisselkar	Shanley Auto Co.			
Morris Plains, N. J.	Chevrolet	Johnston & Co.			
Nashville, Tenn.	Chevrolet	Cumberland Motor Co.			
Nebraska City, Neb.	Kisselkar	Ed. S. Gregg.			
New Bedford, Mass.	Chevrolet	Knickerbocker Garage.			
New Bedford, Mass.	Kisselkar	Benj. C. Trip.			
New Bloomfield, Mo.	Chevrolet	D. H. Brown.			
New Castle, Pa.	Chevrolet	J. P. Cook.			
New Hampton, Ia.	Franklin	Larson & Struble.			
New Orleans, La.	Chevrolet	Thompson & Edwards.			
New Orleans, La.	Oakland	Denny-Bird Motor Co.			
Newton, Ia.	Kisselkar	C. S. Weston.			
Newton, Kans.	Kisselkar	Newton Auto Co.			

ELECTRIC VEHICLES

Los Angeles, Cal.	Borland	Borland Elec. Car Co.
Philadelphia, Pa.	Borland	Borland Electric Garage.
Rock Island, Ill.	Borland	Totten Auto Co.
St. Louis, Mo.	Buffalo	Electric Car. & Svc. Co.

COMMERCIAL VEHICLES

Columbus, O.	Chase	M. Morton.
Columbus, O.	Dart	Fisher & Wilson.
Columbus, O.	Stewart	F. E. Avery & Son.
New Orleans, La.	Selden	Jos. Schwartz & Co.

Accessories for the Automobilist

REAR Light Alarm—The importance of keeping the rear light lit to avoid collision and possible arrest for failure to do so has led the Guaranteed Specialties Co., Newark, N. J., to put on the market a simple device, Fig. 1, that operates a buzzer whenever the tail light goes out. The buzzer is inclosed in a cylindrical case that is dust, water and fool proof, and which may be attached to the car at any convenient place. To instal it, it is only necessary to connect binding posts 1 and 3 in series with the tail lamp and to run a wire from 2 to the other wire of the tail light circuit. The interior mechanism of the buzzer consists of two main parts, a buzzer and automatic switch connecting points 2 and 3, and a solenoid that controls this switch and which is connected across 1 and 3. As long as the lamp circuit is unbroken current flows through the solenoid, and the magnetic force it produces keeps the switch from flying over and closing the buzzer circuit. However, as soon as the lamp goes out, current stops flowing through the solenoid, the consequent magnetic force ceases and allows the switch to make contact and ring the buzzer. The alarm is designed to operate on the ordinary 6-volt lighting circuit, and it is claimed that it requires no attention after installation. This concern also makes an outfit for converting an oil tail light into an electric one. It consists of an adapter to fit any oil burner, a socket with covered terminals, 6-volt, 4-candlepower tungsten bulb, switch, wire, wire clamps and rear light alarm. The price is \$10 for the whole outfit, and the alarm alone lists for \$5.

Haynes Tire Pump—A two-cylinder, engine-driven tire pump, Fig. 3, made by the Kokomo Brass Works, Kokomo, Ind., is the latest feature in equipment

on 1914 Haynes cars. The cylinders, of extra heavy tubing, have a bore and stroke of 1 5/8 by 2 inches and are held in place by bolts running from the cylinder head to the crankcase. The crankcase is divided into upper and lower halves, the bottom part having four bosses cast on it to receive the bolts that fasten it to the supporting bracket. Lubrication is by splash, with a reservoir in the bottom of the crankcase into which the connecting rods dip. The pump is driven by a spur gear on the magneto and water pump shaft, engagement being obtained by sliding the driven gear into mesh. The connecting rods are made of a special grade of bronze and the crankshaft is a drop-forging, ground to size. The pistons are steel rings, accurately ground to size to minimize friction and are packed with leather. The suction ports consist of a series of holes extending around the cylinder walls, and which are uncovered by the piston as it nears lower dead center. The partial vacuum thus caused fills the cylinder with a charge of air as soon as these ports are exposed. Discharge occurs near the end of the compression stroke, the air being delivered to the tire through a spring seated ball-valve located in the cylinder head as soon as the pressure in the cylinder rises high enough to overcome the resistance offered by the valve and the pressure in the line. A relief on the discharge line prevents the pressure from building up to a point that might burst the tire, while a gauge is furnished to indicate when the tire is properly inflated.

Hoover Shock-Absorber—As a result of the popular demand for a low-priced but efficient shock-absorber, the W. H. Hoover Co. has brought out the device shown in Fig. 4, to sell for \$10 per pair. It consists of two principal parts, the

spring A, which is attached to the floor of the car by a suitable bracket, and the connecting leather strap B, which passes around the axle. This strap is made of double thickness, extra heavy leather of great durability, and is provided with a buckle for adjustment. A rebound strap limits the upward motion of the car beyond a certain point, the illustration showing it in its normal position at C.

Edelmann Trouble Lamp—A handy trouble lamp, simple in design and selling for the reasonable price of \$1, is shown in Fig. 5. The bulb is screwed into a socket in the handle, and is protected by a wire guard to which a nickel-plated reflector is fitted. Ten feet of wire and an adjustable hook for hanging up the lamp are part of the equipment. This device is made by E. Edelmann, Chicago, Ill., and is distributed in the East by Asch & Co., 1777 Broadway, New York, N. Y.

Neverleak Top Covering—Neverleak top material, manufactured by the F. S. Carr Co., Boston, Mass., is a surface-coated fabric having the appearance of the finest English grain leather. The surface coating is made from a foundation of new, live rubber, toughened and compounded by secret processes. This is reinforced by a second water-proof inter-lining, combining the surface fabric to the inside lining, thus making it, as the maker claims, doubly water-proof. It is claimed that it will not shrink or blister and will not fade from the effect

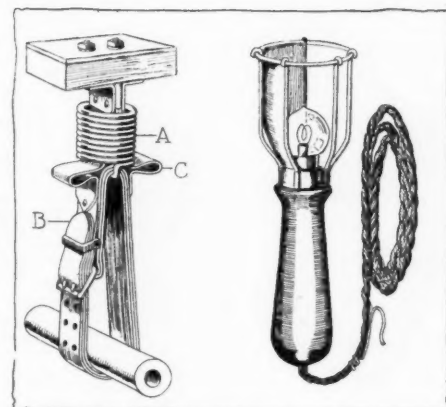


Fig. 4—Hoover shock absorber, showing the manner in which it is attached to the floor and axle

Fig. 5—Edelmann trouble lamp, with reflector, wire guard and hook for hanging up

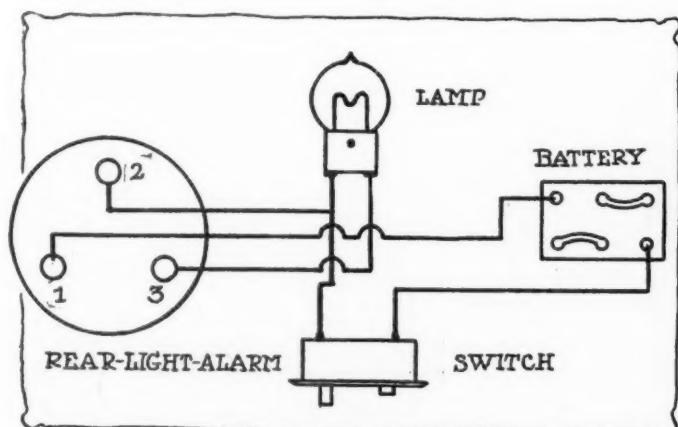


Fig. 1—Diagram of wiring for installation of the rear light alarm. Points 1 and 3 are connected in series with the tail lamp, and 2 to the other wire of the tail light circuit



Fig. 2—Half-size illustration of alarm, showing hard rubber, airtight case

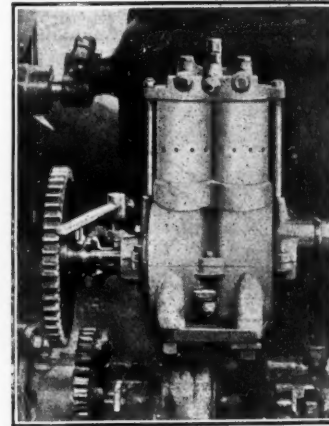


Fig. 3—Haynes tire pump, showing mounting, gear drive and starting lever

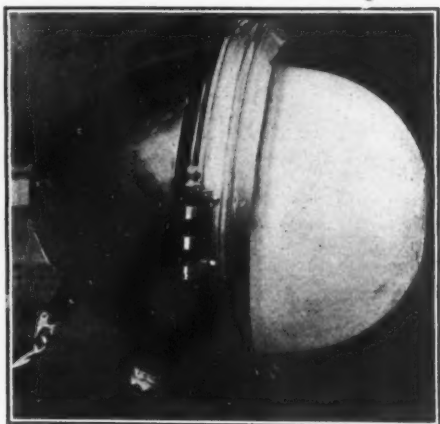


Fig. 6—Luyties non-blinding headlight. A special frosted glass is used, which gives a diffused light

of exposure to the sun or bad weather.

Dover Electric Bulb Case—To meet the needs of the motorist for a safe means of carrying spare electric light bulbs, the Dover Stamping & Mfg. Co., Cambridge, Mass., is making a black enameled sheet metal case with capacity for six bulbs. Provision has been made for two head light, two side light, a tail light and speedometer light bulbs. The case has been designed for bulbs with an Edison base, as this is the type in general use. The price is \$1.

Non-Blinding Headlights—Otto Luyties, consulting engineer, 546 Fifth avenue, New York City, has invented and patented a new type of non-blinding electric headlight, Fig. 6, designed to make driving at night both easier and safer for automobilists as well as other users of the highway. This headlight differs from the conventional type in that the lens, instead of being flat is dome shaped. In place of ordinary glass, frosted glass is used which produces a diffused light, showing only a small bright spot at the center. This does not produce a blinding effect because of the dimmer light surrounding it. The maker claims that his lamps throw a more effective light on the road than the ordinary lights without the wasteful scattering glare, and that the power of the headlights can be increased by almost half. Besides the non-glaring feature the Luyties light has the additional advantage of rendering side lights unnecessary as they illumine the sides of the road. The new glasses are stronger than the ordinary type because an arched surface is better than a flat one, according to the makers.

Midget Ammeter—An ammeter, of

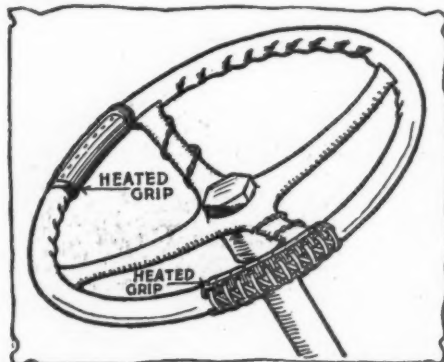


Fig. 7—Electrically heated grips for steering wheel made by the Motorist Warm Grip Co. for winter driving

small size and neat appearance, designed especially for automobile work, is shown in Fig. 8. This instrument is the product of the Eldridge Electric Mfg. Co., Springfield, Mass., and is designated the Midget G. This meter is of extremely small dimensions, the face diameter being only $2\frac{5}{16}$ inches, while the projection above the dash or cowl is only .25 inch. All connections are made from the back of the instrument. The regular ranges of the ammeter are 10, 15 and 20 amperes with zero-center, reading Charge and Discharge. Voltmeters similar in construction are supplied with ranges of 10 and 15 volts.

Dawson Hardened Copper—S. R. Dawson Hardened Copper Co., 140 West Fifty-second street, New York City, has had on the market since early in 1910 a bearing composition known as Dawson hardened copper. This is a copper and tin alloy in combination with other elements constituting a secret process. This bearing metal has been used with very general success. It can be made uniform in composition because there is no oxidation or slag to remove from the molten metal due to the oxygen being held in combination with the metal. For this reason bushings can be reworked, the scrap being as good as the original metal. In recent tests made by the Government Laboratory at the Brooklyn Navy Yard this bearing alloy showed a tensile strength of 34,000 pounds, an elastic limit of 81,460 pounds per square inch under compression, and a test of 200,000 square inches to fracture.

Automatic Pump—Edward J. Watson and Richard F. Downey, Milwaukee, Wis., have perfected a device which promises to relieve motorists of the worry over the proper inflation of tires and will avoid driving on flat tires excepting in cases of blow-outs or very bad punctures. The device consists of an automatic pump attached to a spoke on each wheel and operated in a manner similar to that of a speedometer, and connected to the inflating nipple by an automatic pressure-regulating valve. When the air pressure in the tire drops below a predetermined number of pounds the pump mechanism is automatically thrown into engagement; it is cut out by action of the regulator valve when the pressure reaches the mark of proper inflation.

Motorists Warm Grips—Electrically heated grips, Fig. 7, that may be quickly attached to any steering wheel are manufactured by the Motorist Warm Grip Co., Marshall, Tex. They are designed to wrap around the steering wheel rim and are held in place by lacings on the outer edges. Current is fed to them by small wires which run down the steering post to the source of supply which may be either a storage battery or lighting generator, or in the case of Ford cars, it is claimed by the makers some of the current generated by the flywheel magneto may be used without detriment to the ignition system. The price, complete, with the wire and switch is \$7.50.

Dover Soap Economizer—This device consists of an ordinary cylindrical galvanized iron pail with the addition of a perforated disk which is to rest on the soap in the bottom. The advantage of this arrangement is that while the water has access to the soap to form suds, the washer's sponge cannot catch pieces of soap and carry them to the car body, thereby causing waste as well as injury to the body. The Dover Stamping &

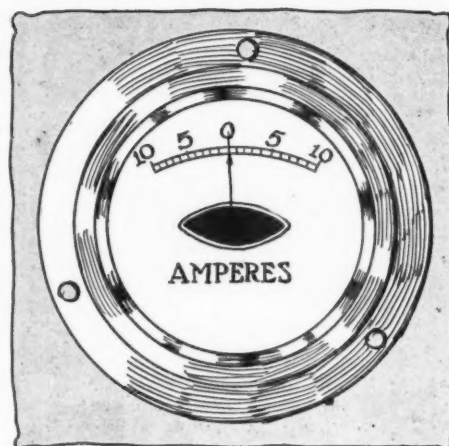


Fig. 8—Midget ammeter made by Eldridge Electric Mfg. Co. It is designed to mount on the dash of the car

Mfg. Co. is the manufacturer and the price is \$2.50.

Thermite Anti-Freezing Solution—The Northwestern Chemical Co., Marietta, O., claims to save motorists the trouble of experimenting with anti-freezing mixtures by offering to him a compound which it calls Thermite. This solution comes in gallon cans and is non-evaporating, one application being sufficient to protect the car all winter, providing there is no leakage. The 100 per cent. solution freezes at the low temperature of 70 degrees below zero Fahrenheit, but a chart has been prepared to show what percentage of Thermite should be used.

The Oxy-Decarbonizer—A new outfit (Fig. 9) for burning the carbon out of cylinders by means of oxygen has been put on the market by the Oxy-Decarbonizer, Boston, Mass. The method of operation is simple, requiring merely the removal of spark-plug or valve cap and the filling of the cylinder with pure oxygen, a lighted taper being then inserted and held in contact with the carbon until it takes fire. Strange though it may seem, the carbon ignites easily because oxygen supports combustion very readily. As long as there is any carbon burning, oxygen is supplied to take the place of what is used up during this process. The oxygen is carried to the cylinder through a small brass tube, which is connected to the oxygen tank of the Decarbonizer by a rubber hose. Gas in the tank is under high pressure, so a reducing valve is located in the line, while a stop cock is used for starting and stopping the flow as needed. A pressure gauge indicates the quantity of gas.

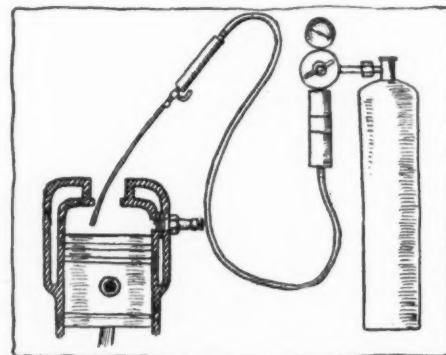


Fig. 9—Oxy-Decarbonizer for burning carbon out of the cylinders. The method of operation is shown